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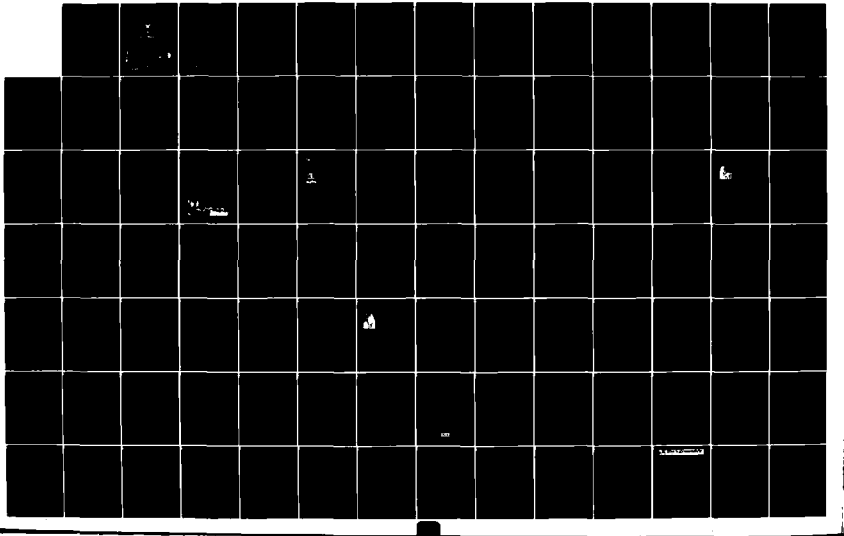

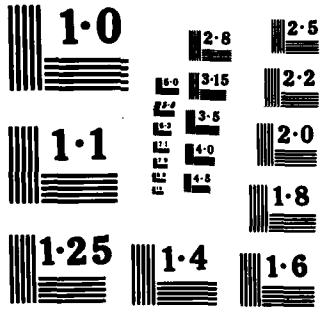
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STUDENT REPORT

AN ANTHOLOGY: RATIONALE FOR A U.S. BALLISTIC MISSILE DEFENSE (1969-1984)

MAJOR ELWOOD C. TIRCUIT 85-2715

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This anthology is a selection and short synopsis of representative articles on the rationale for a US ballistic missile defense (BMD). Unclassified articles and documents were reviewed and analyzed to identify and include nine representative articles in the anthology. The anthology reduces the search for quality material on the subject and documents the fundamental rationale for a BMD. The author concluded that the fundamental rationale for a US BMD is to deter nuclear war. In addition, specific rationale for a US BMD is provided in the anthology. Finally, an extensive bibliography is included in the anthology to enhance further research on the subject.

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PREFACE

This anthology is the selection and inclusion of nine articles that are representative of articles on the subject of rationale for a US ballistic missile defense (BMD) from 1969-1984. For this research, the term anthology is defined as a collection of related or representative articles. This anthology serves as a source to simplify the search and understanding of the rationale for a BMD by reducing the vast number of articles to a quantity that can provide the reader representative articles for review.

All of the articles, documents, and books on BMD at the Air University (AU) Library were not reviewed for this anthology. To limit the writings to a manageable number for the research project, the author considered articles and documents that were 25 pages or less in length and can be found in the AU Library. In addition, the articles and documents reviewed by the author were unclassified. Over 300 articles on the subject of BMD were analyzed for potential inclusion in this anthology. Approximately 80 of those articles adequately covered the subject. The references for these articles are at the end of each appropriate chapter to assist the individual to locate other quality sources for further research on rationale for a US BMD. The author analyzed each of the 80 articles and selected the 9 articles that best represented rationale for a BMD.

The project could not have been completed without the assistance of two individuals at Air University. First, the sponsor for the research, Lt Col Baranowski, provided valuable guidance that enhanced the quality of the final product. The author is especially thankful for the encouragement, advice, and assistance of Major Steve Havron, the project advisor. His willingness to support this project was essential to completing the research project.

ABOUT THE AUTHOR

Major Elwood C. Tircuit was commissioned into the US Air Force in 1972 through the Reserve Officer Training Corps (ROTC) at Louisiana State University.

Since his commission, the author had a variety of missile operations assignments. After attending missile combat crew training at Vandenberg AFB, California, he became a missile combat crew member at Ellsworth AFB, South Dakota in 1973. Four years later, he was assigned to the TOPHAND program in the 1st Strategic Aerospace Division at Vandenberg AFB. In this assignment, he was a launch director and test manager for Minuteman operational test launches. Serving in these positions, the author worked closely with the US Army Ballistic Missile Defense Systems Command (BMDSCOM) to conduct ballistic missile defense (BMD) research and development tests against Minuteman reentry vehicles launched in operational tests. Major Tircuit's association with BMD issues continued with his assignment to the Strategic Air Command (SAC) headquarters at Offutt AFB, Nebraska in 1981.

At Offutt AFB, Major Tircuit concurrently filled two positions. He was assigned to the Operations and Plans' Tactics Directorate in SAC and the Tactics Division in the Joint Strategic Target Planning Staff (JSTPS). As a missile operations plans officer, he was a member of a group responsible for developing a coordinated firing doctrine for M-X deployed with a BMD. In 1984, Major Tircuit attended Air Command and Staff College.

TABLE OF CONTENTS

Chapter One

INTRODUCTION

OVERVIEW

On March 23, 1983, President Reagan stated:

> Would it not be better to save lives than avenge them? . . . What if free people could live secure in the knowledge that their security did not rest upon the threat of instant US retaliation to deter a Soviet attack; that we could intercept and destroy strategic ballistic missiles before they reached our own soil or that of our allies? . . . I am directing a comprehensive and intensive effort to define a long-term research and development program to begin to achieve our ultimate goal of eliminating the threat posed by strategic nuclear missiles (12:215; 13:145).

President Reagan's televised speech about making an effort to explore new and sophisticated technologies for the development of United States defensive measures has often been referred to as the "Star Wars" speech. From these ideas has come the research program known as the Strategic Defense Initiative (SDI) (10:14). His announcement renewed one of the most intense and widely debated issues in the US within the last 15 years. Proponents and opponents are vigorously debating the question of whether or not to develop and deploy a ballistic missile defense (BMD). (NOTE: BMD and Antiballistic Missile (ABM) are used synonymously in this anthology.) One point that both proponents and opponents agree on is that this question is one of the most vital issues concerning US national security today. However, it is not a new one. Interest in this national issue has fluctuated since the late 1960s, but the publications indicate the question has never been far removed from the surface of the government's or public's thoughts. Proponents of a US BMD have written profusely on the rationale for a BMD. Although the basic rationale for a BMD remains relatively unchanged since 1969, specific rationale and the emphasis on different rationale for a US BMD changed and continues to change as technology,

domestic concerns, and international developments change.

There is a large quantity of articles that state, describe, and explain the various rationale from different perspectives since 1969. Therefore, this anthology, a collection of related and representative articles, is designed to capture some of the most representative articles on the subject. The antholoigy serves as a tool to simplify the search and understanding of the rationale for a BMD. The author's intent is not to evaluate or judge the validity, appropriateness, or logic of the rationale presented by the published authors. The intent is to provide a manageable number of published articles that best mirror the other articles on this matter. By doing so, the anthology presents a broad overview of the rationale for a BMD in the US over the last 15 years.

The anthology is divided into three chronological periods: Chapter Two consists of three articles from 1969 through 1976, Chapter Three has three articles from 1977 through 1982, and Chapter Four presents three articles from 1983 through September 1984. Each of these chapters starts with a brief introduction of the major events of the particular period that may have influenced the authors' writing. Each article within the chapter is preceded by a short background on the article's author and a concise synopsis of the author's main points that state rationale for a BMD. In addition, each chapter includes a bibliography of related articles published in that time period. The final chapter, Chapter Five, summarizes the rationale for a BMD that was documented in the selected articles for this anthology. The following brief review of BMD efforts by the US since 1969 provides the basis for understanding the three time periods and the rationale for a BMD.

BACKGROUND

On March 14, 1969, newly elected President Nixon renamed the proposed US BMD system, Sentinel, to Safeguard. More than just the name was changed. The technical components of the system remained the same, but the US BMD program was redirected from a defense of urban-industrial areas to a primary defense of Minuteman intercontinental ballistic missile (ICBM) launch facilities (19:9; 2:120; 21:150). The Safeguard system was planned to be a dual layered defense. In the first layer, the Spartan interceptor would intercept enemy warheads outside of the atmosphere. The high-speed Sprint interceptor would be the second layer of defense to eliminate the warheads that penetrated the first layer of defense and entered the atmosphere. The system was supported by ground

radars and computer systems to accomplish acquisition, battle management, and engagement functions (9:10). Initial Safeguard complexes were planned for Grand Forks, North Dakota and Malmstrom Air Force Base, Montana. However, prior to development, the Anti-Ballistic Missile (ABM) Treaty was signed. This Treaty, again, changed the US BMD program (2:120).

The ABM Treaty was a part of the 1972 Strategic Arms Limitation Talks (SALT I) process in which the US and Union of Soviet Socialist Republics (USSR) reached an agreement to limit BMD deployments. The two countries agreed to limit the number of deployment sites to two; one for defense of the capital and the other for defense of an ICBM field. In addition, the number of interceptors were limited to 100. In 1974, the US and USSR signed a protocol to the ABM Treaty that limited each nation to only one BMD site and banned space-based ABM interceptors. The USSR deployed their BMD around Moscow. The US decided to continue development of the Safeguard complex only at Grand Forks, North Dakota (9:11).

On October 1, 1975, the Safeguard complex at Grand Forks became fully operational. Approximately four months later Congress ordered the close-down of the complex because of high operating costs and the system's inability to protect a significant number of missiles with only 100 interceptors (9:11; 1:5). Research for better BMD technologies continued, but not until a search for enhancing the survivability of the M-X missile came to the nation's forefront did proponents appear to begin again to strongly advocate a BMD (7:15-16). Emphasis was concentrated on the Overlay system (BMD system made up of layers). The first layer of the system that was advocated was the Low Altitude Defense System (LOADS). It was a low-level defense system that could engage reentry vehicles under 50,000 feet. The higher layer of defense would engage the reentry vehicles for the first line of defense (11:32-33). However, President Reagan's call to begin a search for a system to render offensive nuclear ballistic missiles ineffective has given BMD proponents the most current and strongest impetus to declare and defend the rationale for a US BMD.

FUNDAMENTAL RATIONALE

Through research for this anthology, the author concluded that there have been and still are many political, moral, military, and economic reasons stated by authors to develop and deploy a US BMD. Almost every article reviewed presented one fundamental argument for a BMD. The recurring basic rationale is that a BMD is necessary for deterring a nuclear

war. This rationale took many forms, but the authors usually attempted to justify their rationale by presenting data on the perceived threat and US capabilities. The authors questioned the balance of power between the US and USSR and the deterrence maintained through only offensive nuclear weapons. Their conclusion was that a BMD would enhance deterrence and therefore increase US national security. Many of the other reasons given for a BMD evolved from this fundamental rationale and also appeared in a variety of explanations. Each of the following chapters will document the fundamental rationale and some of the specific rationale for a US BMD.

Chapter Two

SELECTED ARTICLES: 1969-1976

INTRODUCTION

In addition to the increased Soviet threat to the US, there were four primary events that influenced the authors' motivation for writing and their rationale for a BMD system during the 1969-1976 time period. These events were, first, the change from developing a widespread defense for the population (Sentinel) to a limited defense for primarily protecting ICBMs (Safeguard) (21:150); second, the signing of the ABM Treaty (19:9-10); third, the negative reaction of the American public to the Vietnam War (5:64); and fourth, improved US diplomatic relations with China in the 1970s (17:957,959).

One of the authors' primary motives for citing rationale for a US BMD was to justify the need for the Safeguard system. As opponents criticized and questioned the need for a BMD, proponents responded with arguments for a BMD like the ones included in this chapter. Most of the rationale presented for a BMD during this period was and is used as a basis to justify a US BMD in subsequent years. Some of the rationale is still used in the 1980s. However, these articles present the rationale with an emphasis that is distinguished by the threat and events mentioned above.

appeared as a substitute for development and advocacy of constructive domestic programs. This is not, to be sure, an argument in favor of Safeguard, nor is it a confession that expenditure for Safeguard should be abandoned if "better" domestic programs were available. The fundamental point is that it is artificial — intellectually, economically, and politically — to allege that expenditure of resources on Safeguard denies us real opportunities to deal with our domestic problems.

must have defensive options at his disposal as well as offensive or retaliatory ones.

In fact, on national security, political, and moral grounds, the President's first alternative should be a defensive one capable of reducing damage to the U.S. and saving U.S. lives and lowering the risk to enemy lives by reducing the temptation or the need to retaliate. The Sentinel system in particular was designed to provide this capability. Because the Safeguard system uses the same basic components, though in different configuration, it would also provide this defensive option at least to a limited degree.

Some opponents of the Safeguard system, while arguing on grounds of national security and morality, have anomalously urged instead a doctrine of "launch on warning." That doctrine attempts to make a virtue out of lack of a defensive option; it is the virtual equivalent of preferring a doomsday machine. Deliberately to choose to make "doomsday" possible is to ask the entire world to be willing to pay too high a price for an alleged — but far from clear — improvement in stability derived from making nuclear war "totally" unthinkable.

It is quite conceivable that the first few missiles to attack the U.S. in a future crisis may be the result of an accident, a desperate miscalculation, or an attempt by some other power to precipitate a nuclear exchange between the U.S. and the USSR. To the extent that nuclear war is possible at all it seems basic to national prudence that we should have a capacity to defend ourselves against a limited attack. On the other hand, it is almost beyond credibility that a limited defensive capability would seriously endanger a Soviet retaliatory capability and thus destabilize the strategic balance of mutual deterrence. As Secretary of the Air Force, Dr. Robert Seamans, has said, the Soviets would have no incentive to increase their offensive forces if we deploy a limited A.B.M. system unless they wish a capability — or the appearance of one — to launch a first strike on us.

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Competition with Domestic Programs. It may still be argued that whether or not Safeguard enhances international stability and national security, domestic programs cry out for our attention and our resources with an urgency that supersedes any safeguard against an unlikely nuclear war by deliberate attack or by accident. Unfortunately, there is no objective scale in terms of which we can rank our national priorities or determine what is a reasonable trade-off between domestic and national security expenditures. No one can deny that the allocation of resources among the demands pressing on our national decision makers is a vexing problem. Every national program must be looked at rigorously on its merits and in its total context.

Looked at in context, Safeguard actually represents a rather small relative claim on national resources. Whether measured by the Fiscal Year 1970 requested appropriation or by the anticipated five-year cost of about $10.2 billion dollars, Safeguard would represent annually something under one-quarter of one percent of our gross national product (G.N.P.). On the average over the next five years, it would be about two to three per cent of the annual defense budget. There is no question that $10.2 billion dollars is a large amount of money; but we must ask ourselves whether, in the perspective of the defense budget and our total gross national product, Safeguard represents a reasonable investment in international stability and national security in comparison to alternative programs that may contribute to the same goals.

During recent years, increases in the defense budget have been due almost totally to the Vietnam war. Between 1964 and 1970 the annual dollars spent for defense will have increased by about 55 per cent. However, contrary to experience during the Korean War, the annual percentages of the Federal Budget and the G.N.P. represented by these defense dollars have not grown; they have continued to run at about 40-50 per cent of the Budget and 9-10 per cent of the G.N.P. These have been fairly constant percentage levels since the end of the Korean War. There is nothing inevitable about these proportions, and we must always ask what they reflect about our national priorities. But to ask such a question does not prejudge the answer. It is a fundamental federal responsibility to provide for the common defense. Domestic tranquillity and prosperity are also vital goals, but they do not depend so exclusively on federal wisdom, authority, and expenditures.

Finally, it is not so clear that we know either what money would become available as a result of foregoing expenditures such as those contemplated for Safeguard or what to buy with it. There is almost no evidence to make us believe that a dollar withheld from defense is convertible into a dollar that is available and useful for domestic programs. What does seem certain is that various programs, new or expanded, to deal with domestic needs will increasingly be proposed for federal funding. However, one of the more frustrating aspects of the national debate that alleges that Safeguard is a diversion of resources from high priority needs is that little that is desirable and feasible has yet been offered as federal programs to deal with our domestic problems. Protest against expenditure of funds for Safeguard has too frequently

that began to emerge in the latter months of the Johnson Administration. Intelligence on rapidly developing Soviet capabilities — particularly deployment of more SS-9 missiles than had been expected — has convinced the Administration that our strategic retaliatory forces will need more protection in the mid 1970's than they now enjoy. In particular, the Minuteman component of our strategic forces, while now protected by hardening, will become increasingly vulnerable as SS-9 missile accuracies improve in the mid-1970's.

The present hardening of Minuteman silos is near the limit of what is economically feasible with present technology and it is adequate for the current generation of Soviet strategic missiles. By 1975, however, the advantages in reducing Minuteman vulnerabilities by hardening will have virtually disappeared if the Soviet SS-9 missile accuracy develops in the way that seems probable, and if the missile carries either individual or multiple warheads of the megatonnage that is now possible. The basic alternatives for recovering the relative protection of the Minuteman are to go to superhardening (which is exceedingly expensive and highly difficult technologically) or to go to an active defense of present Minuteman silos by means of an A.B.M. system.

Of course, another way of assuring survival of some number of Minuteman missiles would be to expand the size of the Minuteman force sufficiently to offset Soviet improvements in missile accuracy and increases in the size of their SS-9 force. This latter alternative is one that seems to be particularly conducive to an arms race since the immediate alternative available to the Soviets would be to further increase the size of their SS-9 force and so on in an expanding series.

On the other hand, if active, local defense of all or part of our Minuteman force can protect some percentage of it against a significant number of attacking missiles, the incentives for the Soviets to increase the size of their attacking forces are less compelling. Moreover, protection of our Minuteman forces by an A.B.M. system need not appear threatening to the Soviets at all since A.B.M.s to protect our Minuteman forces would have no conceivable role in a first strike against the Soviet Union. The same thing cannot be said for an increase in the size of our Minuteman forces which the Soviets may believe under some circumstances could or would be used in a first strike against them. If, therefore, assurance of survival of a significant percentage of our Minuteman forces is needed, protection by an active defense, that is, by an A.B.M. system, seems much the preferable course from the Soviet view as well as our own to the other alternatives available to us — principally that of increasing the size of our Minuteman forces.

The legitimate question still remains whether we need to protect Minuteman if we have the Polaris/Poseidon and B-52 forces for retaliation. In general it is prudent to do what we can to protect each of these forces — independently — that is, whether or not the others have suffered a diminution of their protection. As Admiral Rickover has recently stated, there is no reason to believe that the Polaris force is now in danger of being knocked out in a Soviet first strike. However, the protection of the Polaris force depends on the concealment and mobility it enjoys by virtue of being a submarine-carried force. This protection is highly vulnerable to a technological breakthrough in submarine detection and tracking capabilities — capabilities the Soviets are known to be working on intensively. The B-52 force is, of course, highly vulnerable on airfields. The protection of either of these forces into the 1975 period cannot be taken for granted.

Moreover, from the point of view of national command and control, they suffer in comparison to Minuteman forces, one significant disadvantage that derives from the same characteristics that provide their protection: namely: their mobility and remoteness make communications with them more difficult and more vulnerable. When the limitations of the submarine and B-52 forces are combined with sober estimates of their future vulnerability as retaliatory forces, a feasible protection of the Minuteman force becomes highly desirable.

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A Strategic Defensive Option. Besides this basic argument for the protection of the stability of the strategic balance, there is another moral argument deriving from the nature of the responsibilities shouldered by the President.

At present, with almost no active defensive system, any attack by any number of nuclear forces against the U.S. presents the President with only the choice of responding by retaliating with a portion of our strategic offensive forces or doing virtually nothing militarily. If a light nuclear attack were experienced this means, first, that the U.S. would have to absorb whatever damage that attack would inflict and, second, that we would be sorely tempted to respond in kind, opening an almost inevitable escalation to more attack and counterattack. If on the other hand, the President has an A.B.M. capability that could neutralize a limited attack or minimize its effect on the U.S. retaliation would be by no means inevitable. As Paul Nitze has emphasized, in a crisis the President

IN DEFENSE OF DEFENSE

Robert A. Gessert

Confusion and a deep division within the American public over the value of an anti-ballistic missile (A.B.M.) defense system was reflected in the mid-summer vote in the Senate to authorize about $900 million for expenditure in fiscal year 1970 for President Nixon's Safeguard A.B.M. system.

During the debate that preceded the Senate vote, public and religious presses carried many articles that presented forceful arguments against the Safeguard program. These seem to boil down to two principal issues of moral concern: it is alleged, first, that the Safeguard A.B.M. would introduce a destabilizing element into the strategic nuclear balance just at the time we are attempting to enter negotiations with the Soviet Union for limitation on strategic armaments; second, that deployment of the Safeguard system would be wasteful of national resources needed for pressing domestic problems.

This paper argues, rather, that: (1) the Safeguard A.B.M. system will help assure the stability of the strategic balance in the 1975 period by ensuring our deterrent capability; (2) in comparison with other ways of ensuring our deterrent capability, Safeguard is neither wasteful nor a stimulant to the arms race; and (3) judged on its merits, Safeguard is a good investment in security that should in no way jeopardize domestic programs that are judged on their merits.

Strategic Balance. Since the early sixties, the U.S. has committed itself to maintaining the kind of balance between the strategic forces of the Soviet Union and those of the United States that makes a first use of strategic nuclear weapons by either side virtually unthinkable.

There are many ways — political, diplomatic, and military — for the U.S. to convey its conviction that a first strike by the U.S. is unthinkable and hence plays no part in our strategic intentions. Since Russian planners must consider our capabilities as well as our intentions, we have exercised self-restraint, buying far less of strategic nuclear forces than we could have bought. The dollars allocated to our strategic forces have actually decreased by about fifty per cent over the past decade as we have completed acquiring the strategic nuclear forces conceived to be adequate. At present these are designed to ensure that we could absorb a Soviet attack and still have sufficient remaining weapons — from our Minuteman forces, from our Polaris/Poseidon submarine-launched forces, and from our B-52 manned bomber forces — to deal a retaliatory strike against the Soviet Union.

While each of these strategic systems could have limited first strike use under some circumstances, we have deliberately emphasized and purchased those system characteristics that make them useful primarily in the second strike or retaliatory role. Moreover, we have devoted considerable money and technology to assuring that none of these systems would need to be launched in a hasty response to uncertain signals that we were about to receive an attack. That is, we have made these systems as invulnerable as seemed necessary and feasible to assure, to ourselves and to the Russians, that they could be withheld until it was clear that a deliberate attack had been launched on us.

This is a highly stabilizing posture since it (a) minimizes the temptation toward preemption by either side by showing the Russians that we would not be moved to strike first in a crisis out of fear that we would lose the capacity to do unacceptable damage to them if we suffered the first blow, and (b) clearly warns them that we have a credible capacity to retaliate for any nuclear attack they may be tempted to make. By not emphasizing defensive systems, we have tacitly conceded to the Russians a fully comparable retaliatory capability to deter us from a first strike.

The Future Situation. The question now is why should we be considering any A.B.M. system that would limit either the capacity of the Russians to attack and destroy our strategic forces or limit their capacity to do damage to our population and industry. President Nixon's Safeguard system emphasizes the role of protecting a portion of our retaliatory forces; President Johnson's Sentinel system emphasized the role of protecting our cities against limited attack.

In proposing the new program, President Nixon and his advisors have been guided by developments

Robert Gessert is with the Research Analysis Corporation of McLean, Va. This article has been adapted from a background paper presented at the 1969 Conference on Christian Approaches to Defense and Disarmament in Amersfoort, Netherlands.

maintaining more Minuteman missiles or hardening existing silos, he concludes the BMD option is better economically and less conducive to an arms race.

The author's article was copied from the November 1969 edition of the Worldview magazine and follows on the next page.

ARTICLE TWO - "IN DEFENSE OF DEFENSE"

In 1969, Robert A. Gessert wrote the article, "In Defense of Defense." Mr. Gessert worked with the Research Analysis Corporation in McLean, Virginia when he wrote a background paper for the 1969 Conference on Christian Approaches to Defense and Disarmament. The article in this anthology was adapted from that background paper (4:15).

Mr. Gessert writes that the fundamental reason for a US BMD is the necessity to maintain a viable strategic nuclear deterrence. He believed the US and USSR could maintain a balance of destructive capability if the US deployed a BMD. Since the Soviet threat was growing, it was important that the US insure its ability to retaliate with force and thus stabilize our military relationship with the USSR. Gessert's article is valuable also because he presented two new reasons for the BMD that were not presented in Mr. Laird's comments in "Objectives of the Safeguard ABM System," and were representative of some other authors' comments during the 1969-1976 period.

First, Gessert argues that the BMD is required for moral reasons. His rationale is that the President is responsible for saving lives in the US and ". . . lowering the risk to enemy lives by reducing the temptation or the need to retaliate." Without a defense, a "launch on warning" doctrine might be adopted to insure retaliation capability. Thus, no room would be available for mistakes. Based on this unforgiving type of concept, a third country in the world could instigate a nuclear exchange between the US and USSR by launching only a few nuclear weapons. Survivability provided by a BMD could avoid provoking the US into a massive launch of its strategic nuclear assets.

Gessert's second justification for the BMD, also documented in other articles, is for economic reasons. He contends that a BMD in the US is not economically wasteful. Mr. Gessert presents facts on the FY 1970 defense budget and gross national product (GNP) to state that the Safeguard is a reasonable investment for deterrent capability and national security. In addition, he argues against critics who cry out for funds for their domestic programs. He states that, ". . . there is almost no evidence to make us believe that a dollar withheld from defense is convertible into a dollar that is available and useful for domestic programs." He also argues for a BMD based on the economic feasibility of the BMD.

Gessert briefly compares the economic feasibility of a BMD to other alternatives that may increase our deterrence. From his comparison of the BMD to buying, deploying, and

(2) To insure that we are in a position to defend our population against the potential Communist Chinese ICBM threat if it materializes, or against an irrational or accidental attack by some other nation.

We propose to begin ABM construction on two sites, which will provide us with an option to expand if the threats we have postulated do, in fact, materialize. Having estimated the threat potential, we recommend only that we protect our options to offset it, should it materialize.

Hopefully, arms limitation talks will achieve success, making further expansion of our ABM system unnecessary insofar as the Soviet threat is concerned. There appears to be less likelihood of effective arms limitations agreements with the Chinese Communists, of course. The Nixon Administration's reorientation of the ABM system improves chances for effective negotiations with the Soviets, for Safeguard is more defensive and less provocative than its predecessor, Sentinel.

In summary, the Safeguard ABM decision protects our options to meet the potential threats while:

(1) reducing and postponing our financial exposure for missile defense and deterrent protection; and

(2) avoiding a provocative posture which could inhibit arms talks and heat up the arms race.

When considered against the potential threat we face and the dire consequences of military inadequacy, the Safeguard proposal is sound, essential and deserving of the support of the public and authorization by the Congress.

* * * * *

Strategic Offensive Forces Act as Deterrent

Let me again remind you that quality as well as quantity has a bearing on the effectiveness of a nation's forces. Let me also restate what I have said many times in the three months I have been Secretary of Defense. Today it would be suicidal for the Soviet Union to attempt a first-strike attack on the United States. Although such an attack might well bring unimaginable destruction and loss of life to the United States, enough of our offensive capacity would remain under any circumstances to cause unacceptable levels of destruction in the Soviet Union.

We accomplish this in part by maintaining three different types of strategic offensive systems. Preserving a mix of sea-based missiles, land-based missiles and bombers is a fundamental premise in our own force planning. First, it confronts the enemy with complex U.S. attack plans, which increase our level of assurance for accomplishing any tasks. Second, it causes the enemy to allocate resources for defensive systems, which might otherwise be expended on offensive systems. Third, it avoids technological surprise in any one area of defense which could tend to degrade our deterrent.

If, however, the Soviet buildup of the kinds of weapons that can erode our deterrent or retaliatory capability continues, obviously the margin of safety which the United States now possesses will diminish.

Of course, we do not know what the Soviets intend to do with the SS-9s they are now deploying or the Polaris-type submarines they are turning out at the rate of 6 to 8 per year or the fractional orbit bombardment system which they are continuing to develop. As I said earlier, we cannot read the minds of those in the Kremlin today, much less the minds of those who may be there 8 or 10 years from now. Last year, the dominant official assumption by the United States was that the U.S.S.R. by now would have begun to slow down and halt the expansion of its ICBM force. That assumption proved false.

U.S. Cannot Gamble on Soviet Intentions

We cannot gamble on estimates of Soviet intentions. If the Soviet Union is developing a capability that could endanger this Nation, we must be prepared to counteract it.

Most of us still remember vividly a moment of supreme national peril in 1962. It was widely assumed then that the Soviet Union would never install offensive missiles in Cuba and this presumption prevailed right up to the time that photographic evidence proved it wrong. As Secretary of Defense, I do not intend for this Country to go through that kind of crisis again, but if we must, I intend to see that the United States is in a position to meet such a crisis successfully.

We came through that crisis unscathed because we had a credible deterrent. What the outcome would have been if our strategic capability had been in doubt is a question that should be kept in mind as we discuss the Safeguard system.

Objectives of Safeguard System

Against this backdrop, the Nixon Administration proposed the Safeguard ABM system to accomplish these two principal objectives:

(1) To insure that we are in a position to protect our retaliatory capability against the potential of a Soviet nuclear force in the mid-1970s designed to erode our deterrent; and

Air defenses are very difficult to quantify, but the Soviets spend about twice as much per year as we do for bomber defenses.

Improvements Programmed to Assure Sufficiency of Forces

Let me come back a minute now to qualitative factors. In our own programs we have included what are primarily qualitative improvements in our strategic forces -- development of multiple warheads for our Minuteman and Polaris systems, Safeguard for our Minuteman missiles, and new attack missiles for our bombers. These programmed improvements are among the minimal steps essential to assure the sufficiency of our military forces against the Soviets' potential for achieving numerical superiority in the mid-1970s and beyond. Obviously, we cannot be sure that the Soviets will not also demonstrate a capability to make similar qualitative improvements -- they are testing multiple warheads for the SS-9, for example, and just last week tested an SS-9, as Secretary Rogers pointed out in his recent remarks in New York. The fractional orbit bombardment system (FOBS), which they are also testing, is another example of their attempts at qualitative improvements in offensive strategic forces.

If they make significant qualitative strides, which accompany their approaching numerical superiority, we may find it necessary to further reassess the threat and the sufficiency of our own program.

Comparison of Conventional Forces

In the area of conventional forces, I should point out that a comparison is neither simple to quantify nor easy to evaluate. Such a comparison is meaningless if made in the abstract, for only in an assumed force confrontation does it have a value to the Defense planner. The variables which must be taken into account are therefore as numerous as the possible places and conditions of confrontation of conventional forces. Indeed, it would be stretching the imagination to conceive a situation involving most of Soviet and American conventional forces in which forces of third nations are not also involved on one or both sides.

For purposes of planning, I would not suggest that any and every inventory of Soviet and U.S. conventional forces be corrected by adjustments in our own forces. To make such planning realistic, for instance, we must weigh the forces of both NATO and the Warsaw Pact into the equation when planning for any with any possible confrontation in Europe.

It is a fact, however, that in projected numerical comparisons under authorized peacetime manning levels, the Soviets by 1974-1975 will probably have a superiority in ground forces, if measured in numbers of personnel, of roughly 3 to 2. In numbers of tanks, the Soviets even now have several times as many as has the United States. In tactical aircraft, our current projections show that they can have several hundred more than the United States is programmed to have by the 1974-1975 time period and this includes our carrier-based aircraft. And, in terms of naval forces, we will face a substantial threat from Soviet submarine forces. Today, the Soviets already have approximately four times as many submarines as we have. The majority of the Soviet submarine fleet is conventionally powered at the present time and many of those submarines are short- to medium-range ships. But the fact remains that their very rapid buildup in submarine forces poses a serious and growing threat to our own naval forces.

almost invariably based on some premise as to what that enemy's intentions are. This could lead to a major and irretrievable miscalculation if our judgment on intentions proves faulty. From a Defense planner's standpoint, it would be much more realistic to allow for the possibility of an increase from his present level of effort to a higher one. As a matter of fact, it is a failure to recognize this capability for increase that has most often caused our estimates in past years to be inaccurate. If a mistake in assessing the potential threat is to be made, it would be far safer to err on the side of overestimating the threat. The consequences could be very grave if instead we based our plans on the hope that the potential enemy will scale down his level of effort and that hope fails to materialize.

In planning, therefore, we must compute the size and nature of the threat by projecting the current level of effort of a potential enemy. In doing this we must grant him a level of technology which is based on his past and present levels of accomplishment.

Soviets Capable of Achieving Quantitative Superiority of Forces

Based on this formula and upon the best information available to me as Secretary of Defense, I must conclude that the Soviet Union has the capability of achieving by the mid-1970s, a superiority over the presently authorized and programmed forces of the United States in all areas -- offensive strategic forces, defensive strategic forces, and conventional forces.

It is not possible within the time available and within the bounds of security limitations to illustrate this comprehensively. As you know, superiority is a function of both quantitative and qualitative factors. But assuming, for the purposes of illustration, that there is a qualitative balance in strategic forces between the Soviet Union and the United States, let me illustrate my point in quantitative or numerical terms.

In our strategic offensive forces, we now have 1054 ICBMs, 656 Polaris Submarine Launched Ballistic Missiles (SLBMs) and 549 intercontinental bombers. Except for a reduction in bombers, this is the level of strategic forces presently programmed for the 1974-1975 time period in numbers of delivery systems.

At the present time, the Soviets also have about 1,000 ICBMs in hardened silos, including some 200 of the very large SS-9s. They have about 140 older ICBMs on soft launchers and more than 630 intermediate-range or medium-range ballistic missiles (IR-MRBMs). In addition, they have some 200 SLBMs and about 150 heavy bombers.

In the past two years, the Soviet Union has more than trebled its force of ICBMs, from 250 to 900, and this year the Soviets will have more ICBMs than the United States. They are also producing Polaris-type submarines at the rate of six to eight each year.

Based on the Soviet Union's level of activity in recent years -- including test, development, and production -- they have the capability of achieving by the 1974-1975 time frame a force of 2,500 ICMBs in hard silos compared to the 1054 programmed by the United States. In addition to keeping and modernizing their IR-MRBM force, they have the capability in the same period -- again at present levels of production -- to increase their Polaris-type submarine forces to a size larger than our 41 Polaris Submarines.

In strategic defensive forces, if we project their current research and development activities on new ABM components, they can deploy anywhere from 200 to 2,000 ABM missiles by the mid-1970s.

for the indefinite future. Both warned that additional steps might be required if that survivability was to be maintained in the 1970s. Just before leaving office, Secretary Clifford expressed his "increasing concern" about "the continuing rapid expansion of Soviet strategic offensive forces." He went on to warn that "we must continually reexamine the various ways in which the Soviets might seek to strengthen their strategic forces beyond what now seems probable, and take appropriate actions now to hedge against them."

A careful review and analysis of intelligence on the Soviet weapons build-up, received during the closing days of the Johnson Administration, convinced those with special responsibility for national security that we must take the first steps toward deployment of an ABM system to protect our long-range missiles.

Defense Planning Reviewed

To make the threat aspect of the problem more understandable, it is necessary to talk a little bit about Defense planning and some of the ingredients that go into it. Defense planning is not, as some seem to believe, the result of gazing into a crystal ball. When properly done, it represents an informed judgment that can serve as the basis for responsible recommendations to the President and the Congress on our Defense program.

Two factors are critical: The rapid rate of technological progress and the time requirements for production of weapon systems. These two factors taken together require us to begin work on major weapon systems often as long as 5 or 10 years before they actually become operational. This makes it necessary to try to anticipate what kind of a situation we will face during that time period in terms of the threat from potential enemies.

The second thing the Defense planner must recognize is the difference between a potential enemy's intentions and his capabilities. It should be obvious that any attempt to determine what the other fellow's intentions will be five years from now -- or even at the present time -- is a futile exercise. Even if we could monitor his thoughts -- and we cannot -- we could not place reliance on them because he might be replaced by other decisionmakers. Nevertheless, we must recognize our own potential for influencing his intentions by our actions.

Estimating Capability of Potential Enemy

The principal gauge for assessing what we might face 5 or 10 years from now from a potential enemy is to determine what his capability is today and, based on that, what it can be in the future.

There are several ways in which we might approach this problem of estimating capability. We must begin with known facts. With our current methods of intelligence gathering, we learn with a relatively high degree of accuracy, what a potential enemy has in the way of military forces, what he is testing, what he is constructing, and the present and past rates at which he has proved his ability to perform. I should point out that even this amount of knowledge cannot always tell us the precise capability of his force.

Our minimum goal must be to prepare responsibly to defend our Nation and to insure as best we can our continued capability to deter nuclear war. To do so, we must at the very least consider the potential enemy's capability determined by projecting his current level of activity in the weapons field.

Arguments are often made that a potential enemy will not maintain his current level of military development or production. But this argument is

OBJECTIVES OF THE SAFEGUARD ABM SYSTEM*

As members of the communications media and as interested citizens, you are vitally concerned with the great public issues that face our Nation. Though the Vietnam war remains the number one problem facing the defense community today, the Safeguard ABM proposal of President Nixon currently is receiving the most attention.

The overriding national security goal of the United States is to restore peace in Vietnam and to preserve peace as we face the future. Both our strong desire to move forward with arms limitation talks and our decision to proceed with the Safeguard ABM system are aimed at achieving the goal of peace.

President Nixon, Secretary of State Rogers and I have repeatedly stated our determination to proceed with strategic arms limitation talks with the Soviets because the Nixon Administration believes that this would be the most desirable way of ensuring peace. But the Administration has also made it clear that we cannot base the security of our Nation simply on the hope that such talks will begin and be fruitful.

Necessary to Ensure National Security

The Safeguard system is the minimal step necessary at this time to ensure that the safety and the security of the American people will be preserved if arms limitation talks are not successful in the coming months and years.

At the outset, let us be clear about what the President is proposing to the Congress. He is seeking authorization now to begin work toward deployment by late 1973 or early 1974 of an Anti-Ballistic Missile System to protect two or our strategic missile wings, one in North Dakota and one in Montana. This is Phase I of a system that could be expanded, if circumstances warrant, to provide additional protection for strategic missile sites and, in addition, to protect the entire nation against any attack by the Chinese Communists that can be foreseen in the 1970s or the irrational or accidental firing of a missile by any power.

President Nixon's decision is to reorient the ABM system proposed by his predecessor in 1967 and approved last year by the Congress. It cuts back new obligational authority for the ABM in Fiscal Year 1970 by approximately $1 billion, and moves the contemplated missile sites away from the cities.

Necessitated by Soviet Weapons Buildup

The Johnson Administration, as well as the Nixon Administration, felt very strongly that some kind of ABM system should be constructed. The previous Administration was aware of the possibility that the Soviet Union might seek to develop a capability to overwhelm our land-based missiles and bombers. It was also aware of the potential threat from the development of intercontinental ballistic missiles by China. It had decided a year and a half ago that the time had come to take steps toward increasing protection against China. At the same time, it continued to watch the missile buildup in the Soviet Union, believing, however, as Secretary McNamara said in January, 1968, that the growth of Soviet ICBM forces would decelerate instead of continuing at a higher rate.

Neither of my two immediate predecessors as Secretary of Defense believed that the survivability of the missile forces of the United States was assured

*Address by the Hon. Melvin R. Laird, Secretary of Defense, before the Florida Chipress Association, Panama City, Fla., 25 Apr. 1969.

Force Policy Letter for Commanders Supplement, starts on the next page.

ARTICLE ONE - "OBJECTIVES OF THE SAFEGUARD ABM SYSTEM"

The article, "Objectives of the Safeguard ABM System," is a reprint of an address presented by Mr. Melvin R. Laird to the Florida Unipress Association in 1969. Mr. Laird was Secretary of Defense from 1969-1972 and Domestic Advisor from 1973-1974 in President Nixon's administration (23:1876). As a result, he presents the administration's rationale for a BMD in this time period.

The article presents the administration's viewpoint, but is also representative of numerous authors who were proponents of a US BMD in the 1970s. His basic argument is that the US must build the BMD to counter a potential Soviet threat to US deterrence capability. He provides a short review of the threat in 1969 and the projected Soviet threat due to their military buildup in the late 1960s. The Soviet's deployment of the SS-9 ICBM, testing of multiple warheads for the SS-9, and work on the fractional orbital bombardment system (FOBS) represented a significant threat to US forces. The review serves as a foundation for stating more specific rationale for a BMD in the 1970s.

The rationale presented by Mr. Laird is important because it is restated and expanded on by many other authors that wrote subsequent to him on this subject. His statement of rationale provides a foundation on which other authors followed and expounded. The first part of the rationale for a BMD stated by Mr. Laird was the US could not gamble on the intentions of the Soviets, but that the US must begin work to counteract the projected threat. The risk was too great for the US not to build and deploy a limited ABM system. In addition, the preparation against Soviet military capability would also be a start for preparation against an ICBM threat from Communist China. Although diplomatic relations were improving, China's strategic nuclear forces were included in defense planning. Another reason Mr. Laird gave for a BMD was the BMD could be expanded beyond the North Dakota ABM sites if the threat, especially the threat from China, materialized beyond US projections. He also reasoned that defense would be used to protect our country against accidental attacks by other nations. The ability to avoid escalation into a massive nuclear retaliation because of human error or mechanical failure was important for maintaining world stability. Finally, Mr. Laird argued that a BMD system would help solve US deterrence problems while not inhibiting important arms control talks. He believed the BMD would not provoke an arms race between the US and the USSR, but would allow for meaningful strategic arms negotiations.

The article, copied from the June 1969 edition of Air

ARTICLE THREE - "BALLISTIC MISSILE DEFENSE"

"Ballistic Missile Defense" was written by former US Senator James B. Allen in 1974. Allen was a lawyer and statesman in Alabama from 1938 to 1942, and 1946 to 1967. From 1942 to 1946, he served in the Navy. He was elected to the Senate in 1968 and served in that capacity until his death in 1978 (18:193).

Mr. Allen's conclusions and recommendations were influenced by the ABM Treaty and the growing Soviet threat. This was a time period when detente was being emphasized in US and USSR relations. For example, there was a significant amount of support for controlling the escalation of offensive nuclear weapons in 1974 when SALT I negotiations were occurring. Mr. Allen brings his readers up to the 1974 time period by providing a concise and accurate history of BMD starting with the initial US BMD system, the Nike-Zeus defense system. This history includes a summary of the objectives of the Safeguard system: protect retaliatory forces, defend the American population from Chinese nuclear attacks, and protect the country against accidental attacks. The review provides a reference point for presenting his reasons for a BMD system. He establishes that the BMD had to change as the Soviet threat changed.

Mr. Allen argued that the reasons for the Safeguard were still valid, but a new Soviet threat dictated that the US augment the Safeguard system with additional defense capability. By 1973, the Soviets had tested four new ICBMs, the SS-X-16, -17, -18, and -19. They also developed a multiple reentry vehicle for their submarines and tested multiple independently targeted reentry vehicles (MIRVs) on some of their new ICBMs. Simply stated, the Soviets were increasing the threat to US national security and that threat was unacceptable for the US to maintain the deterrence balance. Therefore, the Soviets had to be countered. Although Mr. Allen acknowledged that the Safeguard system provided protection in the 1970s, he suggested that a site-defense was needed by the US to protect Minuteman survivability in the 1980s. The site-defense recommended by Allen was an active defense with improved capability to provide a terminal defense of hardened Minuteman sites. He adds that the system is "low-cost insurance" against political and Soviet technological development risks. Also a part of his argument was that the site-defense program would be non-provocative in US and USSR relations.

Senator Allen presents his argument for a site-defense based on the requirement for a strong TRIAD: strategic nuclear missiles, submarines, and aircraft. He asserts that the TRIAD

was needed for national security and failure to maintain a strong land-based leg of the TRIAD would critically damage our deterrent force. He believed that the survivability of Minuteman was extremely important because of its unique capabilities and its stabilizing influence. Minuteman is a stabilizing deterrent because an attack on Minuteman sites is an attack on the homeland which would invoke a major US response. The author concludes that site-defense would protect survivability of Minuteman in the 1980s.

Mr. Allen suggested that development of a site-defense system would give the US an option of deploying a significantly larger BMD for Minuteman in an emergency situation. In addition, deployment of the system under the ABM Treaty limit to protect the one site at Grand Forks would create great uncertainty for a Soviet first-stike on US retaliatory capability and thus enhance deterrence.

Mr. Allen's article was copied from the September-October 1974 edition of National Defense and starts on the following page.

Ballistic Missile Defense

Now that the United States may defend only one ICBM complex from enemy attack, the site defense system should be developed to be ready to replace the aging Safeguard as an essential deterrent

Hon. James B. Allen
United States Senator (Alabama)

One of the most controversial defense programs in the United States today is that of ballistic missile defense, or BMD. It is controversial because it is felt by some to be expensive, it has been attacked by some members of the scientific community as not effective, and it is not clearly understood by the Congress or the public.

The latter is probably the biggest problem—and may explain the cliff-hanging 49-to-48 vote in the Senate in 1972 that permitted a partial deployment of Safeguard, the Nation's BMD system. The best way to bring the entire BMD picture into focus is to review the history and rationale for BMD so that we may realistically and logically plot our future course.

Like it or not, the United States has the role of maintaining strategic stability for the West. We are living in a world dominated by two powers with opposing political philosophies. As Defense Secretary James R. Schlesinger pointed out during fiscal 1975 appropriations hearings, when we speak of "balances" or "defense posture" we are talking basically of those things as they relate to us and to the Soviet Union.

So, while we talk of detente and while we continue initiatives in our foreign relations, we must also be certain to maintain the strategic balance. To do less would, in effect, abrogate our world position and vacate the role that made detente a possibility in the first place. Very simply, the alternative is national suicide.

From the U. S. point of view, as long as we were the only country with an advanced rocket technology and a monopoly on atomic weapons, there was no problem. But as the Russians and other nations began to develop nuclear weapons and delivery systems the changing situation became cause for serious American concern (see Figure 1).

Realizing the potential of the intercontinental ballistic missile (ICBM) and submarine-launched ballistic missile (SLBM) to deliver mass destruction deep into the U. S. heartland, the United States began development of a ballistic missile defense system. The BMD mission is the destruction of incoming ICBM and SLBM nuclear warheads before they reach their intended targets.

A typical system consists of interceptor missiles, acquisition and tracking radars, data-processing equipment, and command-and-control communications. After acquiring the incoming reentry vehicles (RV's), the radars provide data to the computers for discrimination and tracking and the computation of launch and guidance signals to the interceptor missiles which then must close to within lethal range of the attacking missile.

In the past 20 years the United States has had five major BMD systems in various phases of research and development, reflecting adaptations to shifting strategic and political conditions. The Nike Zeus, Nike-X, and Sentinel systems of the 1950's and 1960's have been replaced by the Safeguard and site-defense systems of the 1970's.

Nike Zeus was first fired in 1959 and made the world's first successful intercept of an RV in 1962. However, in 1963 it was determined that the mechanically scanning radars employed by the Zeus system could not cope with the projected Soviet threat. Therefore, the research and development program was reoriented and became the Nike-X system. Nike-X introduced phased-array radars to replace conventional radars, replaced the Nike Zeus with the long-range, 55-foot Spartan, and added a new short-range, high-speed, 27-foot missile, called Sprint, for close-in intercepts.

In 1967 Secretary of Defense Robert McNamara announced the decision that the U. S. would deploy a ballistic missile defense system. To be designated Sentinel, the system would utilize components developed under the Nike-X program. The plans called for a 17-site deployment

for area defense of the continental U. S., Alaska, and Hawaii. The system objectives were threefold: (1) to deny or limit damage to the U. S. from the Chinese threat, (2) to provide limited protection of our Minuteman force against the Soviet threat with an option to thicken that protection with local defense, and (3) to provide protection against an accidental launch of a small number of ICBM's from any source.

The Sentinel system included sites near large cities for greater protection of population and industrial centers—a feature that proved highly unpopular with the public. The only site ever started was near Boston, where opposition became politically overwhelming. Furor also was raised over other proposed sites in Chicago, New York, Seattle, and Detroit.

When President Nixon took office in January 1969 he was confronted with a Sentinel program that was meeting stiff opposition from the public. He ordered a halt to deployment pending a review.

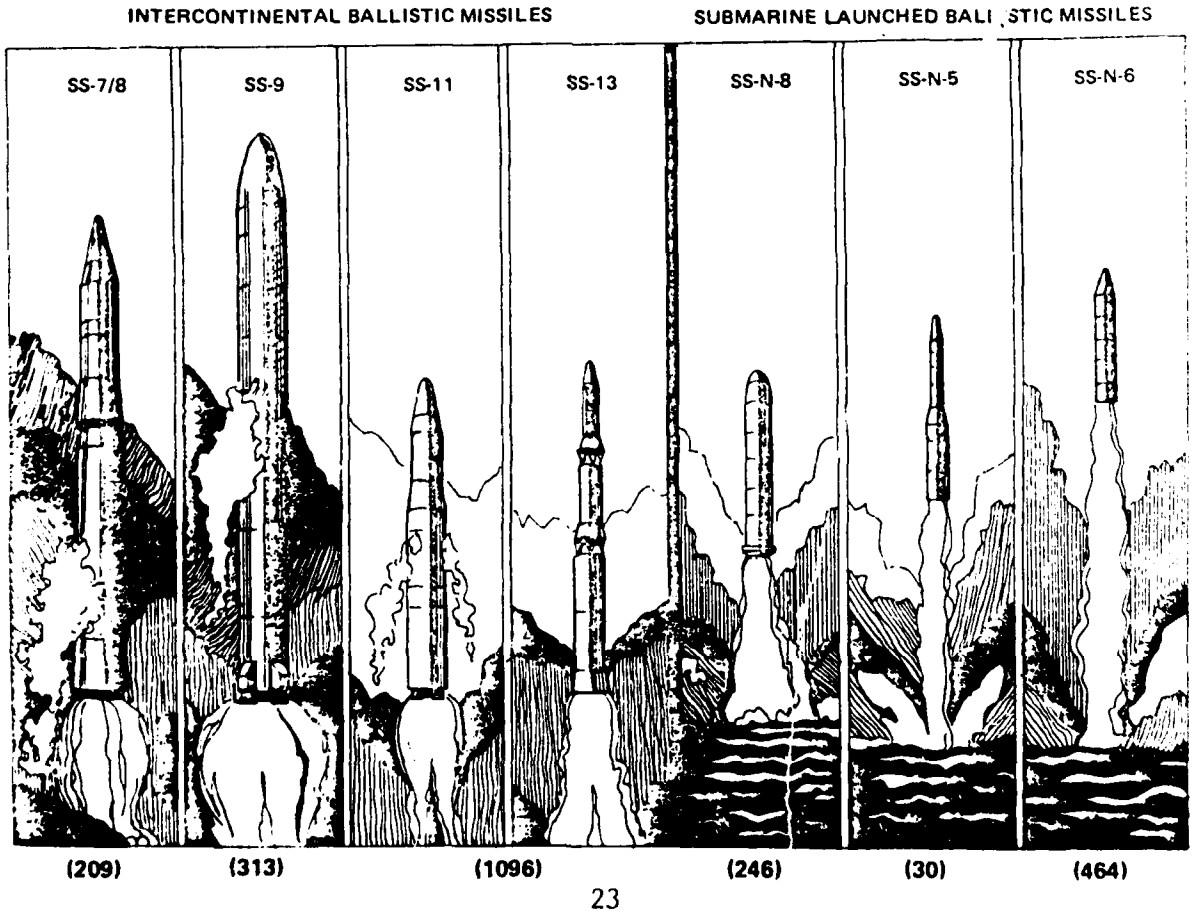
A choice had to be made, and the alternatives available to the new administration were these: (1) continue with the Johnson administration's program; (2) revert to only an R&D program on a Sentinel-type system; (3) terminate Sentinel and shift R&D to advanced BMD technology; or (4) redefine and reschedule the Sentinel program.

The fourth alternative was chosen, for several reasons. First, it was believed that the threat was real, that a defense was required, and that deployment was essential. Secondly, Sentinel was heavily oriented to the Chinese ICBM threat against cities, with little capability against the submarine-launched threat or as a Minuteman-site defense. This was in contrast with the fact that the Soviet threat to our ICBM's and bombers was growing more rapidly than had been projected, while the Chinese threat was progressing more slowly.

Thirdly, two-thirds of the Sentinel sites in the continental U. S. were to be located near major population centers. This could appear to the Soviets as the basis for a thick defense and a threat to their deterrent or second-strike capability. It was reasoned that while we wanted the capability to defend our cities against a heavy attack, it was not feasible and would only cause the Soviets to react with an increased threat. Further, many people were seriously concerned over the possibility of accidental detonation of the nuclear warheads carried by Spartan and Sprint, and they objected to sites near their homes.

After weighing these considerations, the President announced reorientation of the Sentinel program in March 1969. The new Safeguard program had these objectives:

Fig. 1. Soviet intercontinental and submarine-launched ballistic missiles (numbers deployed in parentheses).



• Protection of the U. S. retaliatory forces against a direct Soviet attack.

• Defense of the American people against the type of nuclear attack that Communist China could mount within the decade.

• Protection against accidental attacks from any source.

The President further described the system as follows:

"We will provide for local defense of selected Minuteman missile sites and an area defense designed to protect our bomber bases and our command-and-control authorities. In addition, this new system will provide a defense of the continental United States against an accidental attack and will provide substantial protection against the kind of attack which the Chinese Communists may be capable of launching throughout the 1970's. This deployment would not require us to place missile and radar sites close to our major cities."

The number of deployed sites was reduced from seventeen to twelve, and their locations were shifted away from cities. Deployment of Safeguard was to be in phases, the first phase consisting of two sites, at Malmstrom, Mont., and at Grand Forks, N. Dak.

Even this reduced and reoriented program, remote as it was from population centers, was less than universally popular and touched off considerable debate in the scientific community, the press, and in Congress. However, the 1970 authorization passed the Senate, as did the 1971 bill—both by slim margins.

Meanwhile, testing of the Safeguard system was under way at Kwajalein Atoll in the Pacific where an impressive flight-test record of intercepts against both simulated and actual RV's launched from California was being compiled by Spartan and Sprint missiles.

Then, in May 1972, the SALT effort bore fruit, and an agreement was reached by the United States and the Soviet Union. The agreement was in two parts—the ABM Treaty and the Interim Agreement.

The ABM Treaty permitted deployments in two widely separated areas in each country—one for defense of the national capital and the other for the defense of an ICBM site. The size of each site was not to exceed 93 miles in radius and could contain up to 100 antimissile missiles. Each missile launcher must be land-based and fixed. Restrictions also were placed on radar size and numbers at each site. The treaty specifically allowed testing of new systems and modernization and replacement of deployed elements. This treaty has now been modified by the recent agreement between President Nixon and First Secretary Brezhnev which limits each nation to one site.

The Safeguard site at Grand Forks, N. Dak., has been selected as the single ICBM defense site allowed by the agreement, and construction is now nearing completion. Work on the Montana site was discontinued, and no action had been taken to provide a BMD site in the Washington area. Russia will probably continue with the Moscow defense complex.

Under the Interim Agreement each side agreed to limit its offensive missile launchers to that number operational or under construction at the time of the agreement.

When the U. S. Senate voted to ratify the Interim Agreement on offensive weapons and the ABM Treaty, mine was the only vote cast against both. Significantly, some of those who voted *for* ratification now agree that, in retrospect, the quantitative ceilings set by SALT appear greatly to favor the Russians who are permitted 2,360 launchers, including up to 950 submarine-launched vehicles, as opposed to a total for the United States of 1,710 launchers, including up to 710 SLBM's.

In terms of numbers, then, the United States lost its front-runner position in the missile race and has, in total number of boosters at least, fallen behind the Soviets. Under the agreement, the Soviets are allowed 38 per cent more strategic boosters than the U. S. and with a significant throw-weight advantage.

In his testimony to the Congress on the fiscal 1975 military budget, Secretary of Defense Schlesinger recalled President Kennedy's conclusion, reached in the early 1960's, that the United States needed "alternatives other than suicide or surrender."

"If anything," Secretary Schlesinger said, "the need for options . . . is more important to us today than it was in 1960."

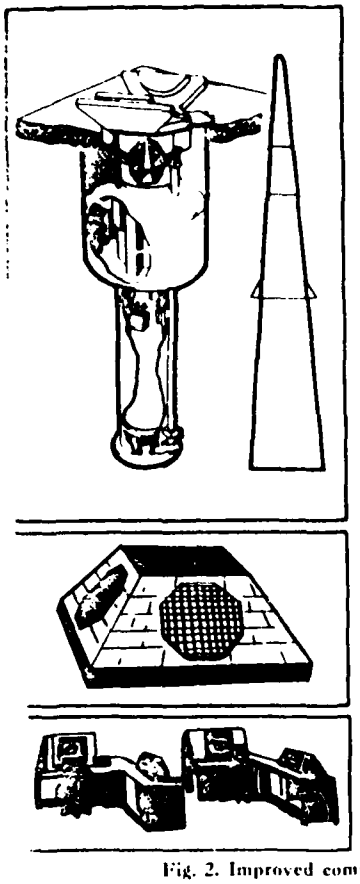
He confirmed that in recent years the U.S.S.R. has been pursuing a vigorous research and development program. "This we had expected," he said, "but its breadth, depth, and momentum as now revealed comes as something of a surprise to us."

Secretary Schlesinger added these points: During 1973 the Soviets tested four new ICBM's—the SS-X-16, -17, -18, -19—and have developed their first MRV (multiple reentry vehicle) for a submarine-launched missile. Three of the four new ICBM's have been flown with multiple independently targeted reentry vehicles (MIRV's). The SS-X-18 has about 30 per cent more throw weight than the current SS-9 it will replace. The -17 and -19 missiles have three to five times the throw weight of the SS-11's they will replace. If all three new ICBM's are deployed, Soviet throw weight will reach an impressive 10 to 12 million pounds. They would then possess a major one-sided counterforce capability—and that is impermissible from our point of view.

What this tells us is that once again we have grossly underestimated the Russians—both their intentions and their technical capabilities.

The counter to this massive Soviet capability is the U. S. strategic deterrent force made up of land-based ICBM's, sea-based SLBM's, and Strategic Air Command bombers. Together these elements constitute the "triad" which is the basis of America's retaliatory capability.

This combination of three different strategic-offense force elements compounds the Russian's first-strike problems. Each force element would



SYSTEM
- INCREASED PERFORMANCE
- REDUCED SYSTEM COST

MISSILE
- HARDNESS
- ACCURACY
- MANEUVERABILITY
- RELIABILITY
- REDUCED COST

LAUNCH STATION
- REDUCED COST
- SECURITY
- HARDNESS

PHASED ARRAY RADAR
- SMALLER
- LESS POWER REQUIRED
- IMPROVED SHORT RANGE PERFORMANCE
- RELIABILITY
- REDUCED COST
- HARDNESS

DATA PROCESSOR
- COMMERCIAL
- MORE CAPACITY
- HIGHER SPEED

Fig. 2. Improved components of site defense system.

have to be brought under attack simultaneously and without meaningful warning to the other two—a difficult problem that increases the Soviet's uncertainty. In addition, the Russians must use a different detection system to locate each element and a separate defense to protect themselves from a retaliatory response *from* each triad element.

The triad combination is effective in other ways, too, since it prevents the Soviets from concentrating their scientific, technological, and economic resources against any single element of the triad.

If the U.S.S.R. should make a major breakthrough against any one element of the triad, the remaining two elements still would provide a significant measure of deterrence until the U. S. could respond to the Soviets' initiative.

The vulnerability of Minuteman is of special concern in light of our policy of flexible-response options. The options place extra importance on Minuteman because of its targeting flexibility, higher accuracy, payload diversity, and reliable command and control. Moreover, in contrast with our submarine-launched missiles, Minuteman is a stabilizing deterrent. No matter what the circumstances, an attack on Minuteman requires an attack on the U. S. homeland. Presumably, such an attack would result in a major U. S. response—something the Russians would want to avoid. On the other hand, an attack on a missile submarine at sea does not involve U. S. soil and might even be made without nuclear weapons; this is an attack the Soviets might be more willing to risk.

Thus, survivability of our retaliatory force becomes the key to a viable triad, coupled, of course, with the ability to penetrate the enemy defenses.

Penetrability is ensured by our own ICBM and SLBM penetration aids, such as chaff, decoys, and MIRV's. Penetrability also is at the very heart of the B-1 bomber program.

Survivability, or "survivable basing," to use the vernacular, is achieved differently for each member of the triad. In the case of the submarine, survivability is provided by concealment somewhere in a vast ocean. The mobility of bombers offers survivability for that delivery system. And, for land-based Minuteman sites, the ability to survive is provided by "hardening" the launch area against enemy attack, augmented by an active defense.

The "active defense" today is the Safeguard system site nearing readiness in North Dakota.

Survivability of Minuteman against the 1974 threat, which Safeguard is designed to handle, is considered by defense officials as "acceptable." The Safeguard design is good, and the system has proved itself by an impressive record of intercepts of actual ICBM's over the Pacific. But the design is of the early 1960's, and the system employs the technology of the 1960's against a threat level conceived in the 1960's.

But we are now in the mid-1970's—and the Soviets have not been idle. Technology has changed and so has the Russian knowledge of it. As the Soviets continue to improve their land- and sea-based launchers, Minuteman survivability will be far from "acceptable" in the 1980's.

Survivability of our present-day triad is at least partially due to the low reliability and poor accuracy of Russian weapons—factors which the Russians are working to correct through extensive research and development. Such improvements, all clearly allowed under SALT I agreements, could be become a serious menace to Minuteman survivability as early as three or four years from now. Add to that the larger Soviet throw weight, improved technology, and an increase in the number of MIRV's the Russians can toss, and the number of Minuteman missiles that could survive an ICBM attack becomes an alarming question.

In recently released testimony before a Senate Foreign Relations subcommittee, Secretary Schlesinger illustrated the impact of Soviet missile accuracy on the number of Minuteman silos surviving a Soviet first strike. His baseline curve showed a potential of as low as fifty Minuteman survivors. Although this number would increase for poorer Soviet accuracy or fewer warheads used in the attack, the message is alarming.

To put it bluntly, Grand Forks, with the present Safeguard system, soon will not be defensible and therefore will be unable to carry out its retaliatory mission.

What can be done? The answer lies, generally, in what the Russians are doing—and that is continuing research and development work. Specifically, we must continue work to develop a system to augment Safeguard to meet the 1980 threat level. Such a system must be designed with one mission in mind—defense of the Minuteman launch sites.

Site defense is a program to create the capability to provide a needed terminal defense of Minuteman against a larger and more sophisticated threat than the present Safeguard system can handle.

Numerous Army and DOD studies have shown that active defense of the hardened dispersed Minuteman force is less costly with a new modular terminal defense system (site defense) than modifying Safeguard components to the same threat and effectiveness criteria.

Acceptance of these study conclusions and validation of system feasibility resulted in the initiation in 1971 of the site-defense program as a long-term hedge against political and technological developments.

The site-defense system is being designed and tested to accommodate a credible, but very advanced, defense-response to the Soviet offensive threat. The system is fully responsive to U. S. national security interests—providing low-cost, nonprovocative insurance against many of the substantial uncertainties in the strategic environment.

Site-defense components consist of phased-array radars, associated data processors, and modified Safeguard Sprint interceptors (Fig. 2). The radar is similar to the Safeguard missile-site radar, but it is smaller and requires less power. The data processor is a highly cost-effective adaptation of a commercial computer. The Sprint II missile incorporates modifications that increase performance (accuracy, reliability, maneuverability, and hardness) and reduce operation and maintenance costs. The basic elements are arranged in modules, so that if one or more of the radars of a module are momentarily blinded by warhead detonations, their functions can be performed by the remaining radars.

The technical advances of site defense would increase Soviet uncertainty regarding U. S. defense system characteristics and introduce to the Kremlin some defensive unknowns, such as reliability, kill probability, and intercept altitude.

Such unknowns would tend to incorporate conservatism into Soviet calculations and show a higher number of Minuteman survivors. This uncertainty in itself becomes a deterrent against a strategic first strike.

Of immediate advantage, development of the site-defense system will provide the U. S. with the option of responsively deploying a strategically significant defense of Minuteman should it be necessary.

A responsive deployment option is critical to the deterrence potential of the site-defense system. The ABM Treaty allows the deployment of up to 18 new radars and 100 missiles at Grand Forks in addition to the Safeguard radars.

One means of providing a readily expandable base for any emergency would be actually to deploy five or six skeleton site-defense modules at Grand Forks with fifteen to twenty missiles in each. This would provide a means for rapid augmentation to full site capability in the shortest possible time should the treaty be abrogated. It might also buy the time necessary for full deployment.

It is not the intent here to support any one element of the triad at the expense of the other two. All three are essential to a viable strategic deterrent force.

But the vulnerability of Minuteman demands special attention because of our dependence on flexible-response options.

As stated earlier, the SALT agreements, while limiting offensive strategic weapons, did not curtail research and technology development. In permitting a "qualitative race" to continue, the advantage in potential growth areas is in favor of the Soviets. Maintaining a viable deterrent hedge through site defense is the only logical approach to confronting the Soviet threat within SALT.

It is my firm belief that we must increase our weapons research and development activities across the board. Ballistic missile defense cannot be conjured up on the spur of the moment. The capabilities come as a result of continuous work. It is on new technology that our survivability as a nation rests.

In short, Ivan must not only believe we have the *will* to respond, he must also believe we have the *means*. Uninterrupted development of the site defense prototype can give us the means. There is no alternative we can live with. ■ ■

"Survivability of our present-day triad is at least partially due to the low reliability and poor accuracy of Russian weapons—factors which the Russians are working to correct through extensive research and development. Such improvements, all clearly allowed under SALT I agreements, could become a serious menace to Minuteman survivability as early as three or four years from now. Add to that the larger Soviet throw weight, improved technology, and an increase in the number of MIRV's the Russians can toss, and the number of Minuteman missiles that could survive an ICBM attack becomes an alarming question . . . as low as fifty Minuteman survivors."

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Chapter Three

SELECTED ARTICLES: 1977-1982

INTRODUCTION

The period from 1977 through 1982 is recognized as a period of transition in US BMD history. The shutdown of the Safeguard ABM system in 1976 by Congress, after only five months of operation, delineates the start of a new era for US BMD systems (19:11). The initial portion of the period is marked by the absence of very many articles promoting the rationale for a US BMD. Coupled with the demise of the Safeguard system, proponents for a BMD may have been silent because of the cutbacks in many other defense programs considered by some to be more important. For example, the B-1 strategic bomber was cancelled in the Carter administration (7:14). However, support for modernizing our land-based strategic nuclear force during this period later led to considering BMD once again as an alternative for maintaining our deterrent capability.

The search in the later 1970s for a survivable basing mode for M-X and the continued growth in the Soviet threat revived the concept of protecting our ICBM forces with a BMD. The arguments commenced to justify a BMD system in development called the Low Altitude Defense System (LOADS) (5:65). Since LOADS was a terminal defense similiar in concept to the Safeguard system (i.e. protection of ICBMs), most of the rationale for a BMD since 1969 was used in the articles of this period. But new ideas about BMD also surfaced in this period.

Toward the end of this 6-year period, authors' arguments for a BMD for M-X seemed to diminish. In the place of LOADS or supplemental to it, authors began to promote the concept of a space-based BMD. The space-based defense did not automatically eliminate the need for the ground-based defense that was being researched and developed. A space-based BMD system may still employ a ground-based defense in the terminal area as a last layer of defense (14:16). However, not until President Reagan's public announcement of "Star Wars" did this concept gain widespread attention and usher in the next period on the rationale for a BMD (refer to Chapter Four).

ARTICLE ONE - "U.S. STRATEGIC FORCE MODERNIZATION: A NEW ROLE FOR MISSILE DEFENSE?"

Jack F. Kemp is the author of "U.S. Strategic Force Modernization: A New Role for Missile Defense?" The article was written in 1980. In 1970, Mr. Kemp was elected to the US Congress from New York. His background on defense issues is extensive. He was a member of the Congressional Delegation to SALT and the Comprehensive Test Ban negotiations, and Chairman of the Republican Party Subcommittee on National Defense and Foreign Policy. In 1980, he was serving as a member of the Defense Subcommittee on Appropriations (7:11).

Consistent with most articles on the rationale for a BMD, Mr. Kemp's article emphasizes that the massive Soviet military buildup causes an imbalance in world military power. He repeatedly stresses the Soviet's military gains as the impetus for developing a US BMD to sustain US deterrence. In addition, Mr. Kemp states a need for developing a BMD because neglect or delay of our strategic force modernization has given the Soviets the incentive to continue their buildup. The vulnerability of these forces leaves the US in a dangerous position. He does not foresee a US BMD as a "cure-all" for our force vulnerability, but rather a hedge against continued Soviet deployments. Developing a BMD would be an alternative to future Soviet military increases.

Congressman Kemp's extensive description of US force modernization focuses on the land-based leg of the triad. Typical of many authors during this period, he presents the benefits of a BMD to supplement the passive defenses of a mobile M-X missile system. The active defense of a BMD and passive defense of the mobile M-X system combine to make the cost of an attack by the Soviets prohibitive. The number of warheads needed to attack such a system would be unrealistically high and the result would be the balance of deterrence needed between the US and USSR for world stability. He reasoned that US development of such a system would be an incentive for the USSR to discontinue their massive buildup program. The system would also be an incentive for the Soviets to engage in potentially fruitful arms control negotiations.

A key theme in Mr. Kemp's article is his urging not to deploy a BMD unless a situation warrants it in the future. He pushes for developing the BMD as preparation to assure survival of US ICBMs. He suggests that the US be ready to shift to a balance of offensive and defensive weapons.

Mr. Kemp's article was copied from the 1980 summer edition of Strategic Review and starts on the next page.

U.S. STRATEGIC FORCE MODERNIZATION: A NEW ROLE FOR MISSILE DEFENSE?

JACK F. KEMP

THE AUTHOR: Mr. Kemp is a Member of Congress from the 38th Congressional District of New York. He was elected to office in 1970, and currently serves as a Member of the Defense Subcommittee of the Committee on Appropriations, and the Congressional Delegation to the Strategic Arms Limitation Talks and the Comprehensive Test Ban negotiations. He has been Chairman of the Republican Party Platform Subcommittee on National Defense and Foreign Policy.

IN BRIEF

In 1972, the United States abandoned a ballistic missile defense as part of a bargain with the Soviet Union in SALT I. The sacrifice was motivated by a number of assumptions, prominently the belief that the U.S. force of land-based ICBMs would remain secure against attack. Today, the SALT I bargain is unraveling and the threat to U.S. ICBMs is growing ever more palpable. Against the background of evolving U.S.-Soviet strategic force ratios and U.S. force modernization plans, merely the development of a BMD up to the threshold of actual deployment could serve as an important hedge against a potentially overwhelming build-up of Soviet offensive forces—and also as an incentive for meaningful arms control efforts.

The dynamics of an arms competition assure that no question of appropriate "emphasis" between offensive and defensive weapons systems is ever conclusively "settled." The assumptions which make a particular policy choice suitable at a particular time may be quickly undermined or outpaced by unfolding technology, shifts in alliances or changes in strategic requirements and objectives. The United States experienced this lesson already in the formative period of its strategic competition with the Soviet Union, the strategy of "Massive Retaliation" in the early 1950s with its almost exclusive emphasis on U.S. strategic offensive power, gave way only a few years later to a far more pronounced stress on defenses (anti-aircraft weapons and deployments).

More than a decade later, a vituperative debate in the United States over the role of active defense (in this instance, ballistic missile defense) in the American strategic posture was ostensibly "settled" when the Anti Ballistic Missile Treaty was signed in 1972 and subsequently ratified by the United States and the Soviet Union. The controversy that was thus curtailed had penetrated progressively to the heart of U.S. decisionmaking on strategic force modernization.[1]

The decision to forgo ballistic missile de-

fense followed a Soviet-American "bargain" in the Strategic Arms Limitation Talks (SALT I), whereby the United States agreed to abstain from deploying its superior ballistic missile defense technology in exchange for the Soviet Union's acceptance of limitations on its strategic offensive forces—limitations that, it was presumed, would prevent the Soviets from mounting an effective threat against U.S. strategic offensive forces. This bargain still lies at the core of the current assumptions behind U.S. strategic nuclear force modernization. The bargain, however, shows signs of unraveling, and with it several of the important assumptions on which our defense policy has rested.

In 1969, at the zenith of the ABM debate, those opposed to ballistic missile defense (BMD) deployment argued that the prospect of the Soviets achieving a significant counterforce potential against the fixed-point strategic forces of the United States was simply too remote to justify major investments in BMD. Indeed, one of the leading anti-BMD spokesmen, Professor Wolfgang Panofsky, pledged that he personally would support the deployment of a BMD system around U.S. offensive missile sites should the threat emerge.[3] Well, today the threat has emerged—in stark dimensions.

The consequences of this emergent danger to the survival of U.S. Minuteman ICBMs (and with them, submarines in port, non-alert bombers and critical command and control facilities) are well described elsewhere, and need not be reviewed in detail here.[4] Rather, this article deals with the broad implications of the evolving strategic scenario for U.S. decision making with respect to the modernization of the strategic forces, and the role which may properly be assumed by ballistic missile defense.

Specifically, this article addresses the question of the appropriateness of U.S. strategic doctrine to the conditions of the 1980s, the character of U.S. strategic modernization programs and the potential relationship of BMD to those programs. During the 1970s, the modernization of U.S. offensive forces and ballistic missile defense were viewed as mutually exclusive policy alternatives. In light of the expectations which dominated the post-SALT I defense policy of the United States, such a view was understandable. But the expectations of the 1970s, let alone of the 1960s, have given way to a far less optimistic outlook for the 1980s, with the term "dangerous" resounding ever more ominously in projections of the coming decade.

The Strategic Assumptions of the 1960s and 1970s

The basis for the modernization of U.S. strategic forces was set in the late 1960s and early 1970s; it comprised a set of expectations about future Soviet behavior and about the contours of the arms control environment. Although it was clear that Soviet strategic forces in the late 1970s and early 1980s would be substantially larger than they were in the mid 1960s, no plans were cast for a significant expansion in the number of U.S. strategic delivery systems. Rather, U.S. strategic force modernization leaned on the objective of assuring the ability of U.S. strategic offensive forces to survive a potential attack several times larger than that which the Soviets were capable of mounting in the late 1960s.[5]

The U.S. bomber force was to be modernized with an aircraft capable of rapid runway escape and an ability to penetrate advanced area and terminal air defenses. The B-1 bomber was subsequently canceled by the Carter Administration in 1977, but its replacement—the air-launched cruise missile—was justified on roughly the same grounds. Indeed, the ALCM was described by its proponents in the U.S. Administration as a more efficient penetrator of hostile air space than a manned bomber.

The sea-based force, composed of 41 Polaris-Poseidon class submarines, was to be replaced by a larger and more capable submarine-missile combination, the Trident. At-sea survivability was improved by dint of greater range—hence built into the system design against acoustically based anti-submarine warfare and the potential for greater concealment owing to the longer range of the missile (Trident II with a range in excess of 6,000 nm).

The most difficult target of strategic modernization has also been the most urgent—namely, the land-based ICBM. The simple and inexpensive "fixes" to the ICBM survivability problem—increasing the numbers of launchers and/or increasing the blast-resistance ("hardness") of ICBM silos—were negated by substantial Soviet gains in ballistic missile delivery

tions about the MX lead-time. At present the MX ICBM has an initial operating capability date of July 1986, a date which almost certainly could, and in my view should, be brought forward to December 1984 or January 1985. Since LOADS comprises so-called 'state-of-the-art' technology, there is no persuasive reason why it could not be deployed *with* the MX missile if the government so wished.

At present some defence commentators are arguing that deceptively based MX will be viable in relation to the possible growth of the Soviet threat (i.e. the increase in warheads capable of killing hard targets) *only* if LOADS is deployed.[16] This is simply not true. The US defence community currently assumes that by 1986 the Soviet Union could deploy some 6,000–7,000 such warheads on her ICBM force. But when one allows, realistically, for the Soviet ICBM warheads needed to target *Minuteman*, *Titan* and other high-priority hard targets, and then makes prudent allowance for a Soviet reserve force requirement, it appears that the USSR would need something like 8,250 ICBM warheads to neutralize the deceptively based MX system (and other hard targets) – on an imprudent one warhead to one shelter basis.[17] More sensibly, allowing for the unreliability of their offensive systems, Soviet planners would need to allocate nearly 13,000 warheads to neutralize the basic MX shelter deployment (and other hard targets). This, however, is only the beginning of the Soviet counterforce planning nightmare. 'Baseline' MX sheltering, at 4,600 shelters (200 'linear tracks', each with 23 shelters) will be designed so that it could be expanded to accommodate 9,200 shelters through so-called 'back filling'. Needless to say, the defence leverage acquired by doubling the deceptive basing structure makes LOADS even more cost-effective.

Beyond LOADS, the US Army is developing what is called an exoatmospheric 'overlay' BMD system. Designed to intercept above the atmosphere, this technology is much higher risk than LOADS. However, if fully developed the 'overlay' system will have characteristics qualitatively different from those of the exoatmospheric defence envisaged for the *Spartan* ABM in the *Safeguard* system. Above all, it will utilize a true revolution in optical discrimination and could greatly strengthen a hard-point LOADS deployment or provide area coverage for urban-industrial America. As currently envisaged, the 'overlay' system would entail the launching into the threat corridors of 'probe' missiles (activated by launch threat signals from the early-warning satellites) which would identify likely target vectors and would distinguish real targets from decoys, chaff and debris (the long-wave infra-red part of the electromagnetic spectrum). These missiles would then 'hand over' their threat data to the warhead 'buses' of long-range interceptors, which would in their turn 'hand over' threat data to non-nuclear homing vehicles which could neutralize the targets through impact or fragmentation.

Exoatmospheric non-nuclear-kill is, at present, a high-risk technology. Prominent among the other technical challenges facing the BMD 'overlay' are the problems of precise aim point prediction (homing interceptor warheads could be wasted upon incoming warheads that would hit empty MX shelters); late mid-course re-entry vehicle manoeuvrability (a warhead judged innocent could rapidly, and almost at the last minute before re-entry, turn into a potent threat); on-board data processing; optical discrimination; communication, command and control; precision decoys; and the sheer quantity of targets to be distinguished.[18] The 'brute force' solution to these difficult problems is termed 'subtractive defence'. Each exoatmospheric interceptor missile would be packed with as many homing vehicles as possible and would attack every likely-looking target. A more sophisticated, though costly, approach to the mid-course discrimination problem would be to add radars to the 'probe' missiles and the 'buses' on the interceptor missiles. In terms of lead time for initial deployment, LOADS and the exoatmospheric 'homing overlay' could, given appropriate funding, achieve initial operating capabilities in about 1985 and the early 1990s respectively. Almost needless to say, a two-tiered BMD system (or better still a three-tiered one – adding interception in the ballistic missile boost, or very early mid-course phase) could offer dramatic reductions in offensive 'leakage' compared with a one-layer system.[19] Also, multi-tiering, relying on different kinds of discrimination (say, radar *and* optical), provides a substantial hedge against 'clever' offensive decoy design or tactics, or the catastrophic failure of particular defence discrimination and engagement technologies.

industrial America ('thick' or 'thin') is very unlikely to deprive the Soviet Union of her 'deterrent', because the evidence to hand suggests very strongly that, for her, deterrent effect is a function of anticipated war-fighting prowess. To the best of our knowledge, she has little interest in actually punishing American society, and urban-industrial American would be a likely target only insofar as it contributed to the material resources for the conduct of a war. However, the Soviet Union has to be presumed to have an interest in maintaining a high probability of American self-deterrence.

One cannot be certain – there is a severe shortage of evidence – but on the basis of Soviet words and deeds it would appear that there is *no* Soviet assured destruction requirement *vis-à-vis* the American homeland which could be endangered by US area BMD deployment. If this tentative claim is correct, then the deterrence stability (arms-race, crisis and arms control) charges against US area BMD deployment are almost entirely the result of American strategic-cultural preconceptions: plausible but, in Soviet terms, incorrect. In the context of US BMD deployment, Soviet BMD would not be a destabilizing development.

Present BMD Technology

In LOADS the US Army has developed a system dedicated to the defence of hardened targets. LOADS comprises a well hardened radar of modest dimensions (since it has only to discriminate, identify and provide engagement data for targets that have re-entered the atmosphere, and are vectored very narrowly),[13] and an inertially guided interceptor roughly half the size of the *Sprint* missile of *Safeguard* vintage. Although LOADS could defend the existing *Minuteman* fields, it is ideally suited, and indeed has been designed, to defend a deceptively based ICBM system.

The MX basing scheme as currently envisaged – 200 ICBM deployed one to each 'linear track' with 23 horizontal shelters (the 'loading dock', rapid horizontal 'shuffle' system) – multiplies the prospective effectiveness of LOADS to what should seem to Soviet General Staff analysts to be a profoundly discouraging degree. Specifically, if a shelter-warhead kill ratio of unity is assumed (and also unrealistically no reliability problem) the Soviet Union can be certain of 'killing' one MX for every 23 warheads dispatched to saturate a particular 'linear track'. However, if a minimal LOADS deployment (one interceptor per 'linear track') is added (at an estimated FY 1980 cost of $11–12 billion), Soviet targeteers – not knowing which shelter contained the MX missile – would have to double their warhead allocation, since the interceptor missile *could* be defending any of the 23 shelters. This is known as a 'preferential defense' tactic: the LOADS interceptor(s) would 'prefer' to defend the shelter with the missile, but the Soviet target planning staff would not know which that was. In principle, the Soviet Union could design an attack which might defeat LOADS cheaply; specifically, an initial barrage attack would 'flush' the interceptor, permitting a follow-up re-entry vehicle to attack the shelter which it had preferred to defend. In practice this tactic would, at best, be extremely difficult to effect and, at worst, would be technically infeasible. It is a classic 'back of the envelope' threat – ingenious but probably impractical, and scarcely likely to appeal to responsible Soviet attack planners.

LOADS differs from *Safeguard* in a number of ways: the interceptor missile and radar would themselves be deceptively based, as would the ICBM (MX or deceptively-based *Minuteman*) they were protecting; the LOADS radar, since it would have to provide intercept data only on the threat to one 23-shelter linear track, is harder (*vis-à-vis* nuclear effects) and far smaller than was the *Safeguard* missile site radar; and the intercept would occur at truly minimum altitude, thereby depriving the offence of virtually all of the usually cited 'spoofing' tactics using decoys.[11] On the negative side it must be said that the relatively close spacing of the MX shelters (roughly 6,000 ft apart, or slightly less), could pose noteworthy problems for LOADS radars looking at a threat coming in from the north southwards. The radars might have to look through the nuclear effects of weapons exploded in, or very close to, the threat corridor. However, a Soviet saturation attack that was 'walking in' from north to south would, or could (depending on the timing), entail the risk of severe 'fratricide' as warheads sought to penetrate through, or very close to, the cloud stems of previous explosions.[16]

LOADS technology is currently scheduled for initial operational readiness in 1988. However, that lead-time is tied to questionable assump-

In retrospect, the last two classes of objection to BMD deployment popular resistance to 'bombs in the back yard', and the quest for both a substantive and a symbolic victory over an alleged sinister military-industrial complex – appear largely to have been period-piece rallying cries. However, although it is true to claim that American communities had lived in peace for many years with nuclear-armed air defence missile sites, and that popular ground swells against the munitions makers had been conspicuous by their absence since the days of the Nye Committee (1934), the fact remains that the popular suspicions generated in connection with ABM (though really stemming from Vietnam) have had a lasting impact upon the structure of the domestic politics of defence in the United States. The ABM was the principal weapon-system victim of the new-found lack of trust in official military wisdom which the American public derived from its Vietnam experience. Politically fatal though these objections could be, they were irrelevant to the strategic merits of BMD deployment.

Arguments dating from 1970 to the effect that BMD will not work simply do not apply to the BMD technologies of 1980–90. Yet, given the sources of doctrinaire opposition to BMD deployment, the technical accomplishment of the US Army's BMD programme has had very little impact on policy debate, because the government has not had a strategic conceptual framework with a place for any BMD deployment.

For ease and convenience of treatment, BMD is here assumed to be one of two kinds: the defence of American society, or the defence of American strategic forces (most particularly, of the ICBM force). Notwithstanding the residual uncertainties as to the probable operational effectiveness of ICBM against silos, there is today no serious argument about the prediction that within a year the US ICBM force, as presently constituted, will be almost totally vulnerable to a Soviet first strike. Several anti-ABM spokesmen in the *Safeguard* debate of 1969–70 granted that they would recommend active hard-point defence, when and if 'the threat' materialized.[10] If they meant what they said, they should be pressing today for BMD for the US ICBM force. There is a consensus within the American defence community that the silo-housed *Minuteman* ICBM deployment is on the verge of being changed from a secure second-strike retaliatory force into a lightning conductor for pre-emptive first-strike destruction.

Unlike the situation ten years ago, when the US body politic was debating the merits of the *Safeguard* ABM system, in 1980 the US has a low-risk BMD technology that has been designed for a dedicated hard-point defence. The US Army's Low Altitude Defense System (LOADS), described below, is capable of intercepting *only* at an altitude (about 4,000 ft) which would provide a 'keep out' zone so restricted that unprotected humans or unhardened structures or communication facilities would be fatally vulnerable to offensive war-heads exploded beyond that zone. Because of the ABM Treaty of 1972 (as amended in 1974), with its restriction to one site and its severe radar and interceptor limits, plus the residue of negative doctrinal feeling which has survived from early 1970s, LOADS has not been considered on its cost-competitive merits with other alternatives for the preservation of the US ICBM force. It is not at all obvious that LOADS should be deployed in the near future in defence of US ICBM – the deceptive basing route for *Minuteman*/MX appears to be cost-effective *vis-à-vis* even substantial threat growth – but there can be little doubt that the negative reactions which even today are caused by the very mention of BMD preclude objective analysis of the competitive merits of hard-point BMD.[11]

There may still be some good reason for believing that the BMD of American cities and other high-value economic targets would be undesirable, but the kind of 'deterrence instability' arguments advanced ten to fifteen years ago have lost much, though not all, of their popularity. With very few exceptions, the US defence and arms-control community has come to the conclusion that the Soviet Union does not hold to a concept of strategic stability that is at all recognizable in Western terms. Soviet defence planners may well be pleased to note the totally undefended character of the American homeland, but there is no evidence that would suggest a Soviet force planning requirement, judged to be essential for deterrence, to 'cover' an identified fraction of US civilian-economic assets. The active and passive defence of the homeland, as Michael Howard has suggested, is surely simply a matter of common sense.[12] The BMD of urban-

At least until quite recently (and today, though in diminishing numbers), even officials friendly to some of the possible policy benefits of BMD deployment, have been wont to dismiss BMD options out of hand, on the ground that interesting BMD deployment ideas would entail a more-than-marginal renegotiation of the ABM Treaty, and that would be very unlikely to succeed and would place the whole SALT process at risk. With SALT II defunct, on prudent estimation, the sanctity of the ABM Treaty has diminished dramatically in very recent months.

In 1969–70 it was argued that *Safeguard* would not work. It was claimed that the system's radars could be neutralized by the 'blackout' effects of well-timed precursor attacks, or by the effects produced by defensive missile warheads, and that the computer software, the directing brain of the defence, simply could not cope reliably with the volume of information, assessments and battle management orders required. In addition, it was argued that the radar identification and discrimination of real targets (re-entry vehicles as opposed to decoys, chaff, missile tank fragments and other debris) beyond the atmosphere was too imprecise to allow confidence in the exoatmospheric intercept ability of the *Spartan* ABM. Also, it was claimed that the Soviet Union could aways adopt a 'brute-force' solution to US BMD deployment – that deployment would simply be saturated by more incoming re-entry vehicles than there were interceptors available. For a variety of 'strategic cultural' and bureaucratic-political reasons, the US defence community has long been friendly to the modern equivalent of the belief voiced by British Prime Minister Stanley Baldwin in 1932 that 'the bomber will always get through'. (Fortunately for Britain and the United States this dogma was challenged successfully by the Tizard Committee, with the consequence that the RAF of 1940 had a modern air defence system and an obsolete bomber force.)

The predicted technical incompetence of BMD in 1969–70 was buttressed by fairly casual reference to such offensive ploys as 'salvage-fusing', whereby an in-coming warhead would be detonated by an interceptor warhead detonation, and the deployment of manoeuvring re-entry vehicles (MARVs). Both methods are technically possible but, as of 1981, both are generally judged to be very difficult and costly (in many dimensions) to design and effect. It is a perennial feature of technical debate over 'frontier'-level weapon systems that a missile or capability that is very probably good enough to cope with even severe threats, has to be defended against purely theoretical threats that are extremely unlikely to materialize.

Not infrequently, the claim that BMD would not work did not refer to an anticipated 'catastrophic' failure of the defence, but rather to the expectation that no BMD system would be 100% effective. This claim is of little importance for the active defence of ICBM silos or shelters, but it is often held to be a devastating critique of city defence. While granting that 'leakage' can be permitted, indeed even planned for, with ICBM silo or shelter defence (one might choose to 'give' an enemy a fraction of his hard targets, in order to concentrate defence assets to protect the rest), it is not true that an imperfect city defence is valueless. 'Leakage' can be controlled and even directed to an important degree. The heavy defence of a target may discourage its being targeted, while leakage can be controlled by deploying more interceptor missiles (this is not to deny that heavy defence may lead to heavy targeting allocation). For reasons of technological deficiency, treaty-constrained deployment or unilaterally determined force size, the United States might well be in a position to deny Soviet ICBM and SLBM direct access to most of her urban-industrial assets, though possibly at the cost of denying protection to some. No matter how proficient the ballistic missile defences may be, there can be no guarantee that a few warheads could not penetrate. No defence system should be expected to 'work' with absolute and total success. A measure of 'hardening' for urban-industrial America through civil defence should be the principal policy response to the inevitable defence 'leakage' problem.

Next, it was believed widely, and by people of some strategic sophistication, that BMD was not needed. This claim was relevant to the 1969 *Safeguard* reorientation of the BMD programme. It was argued that there was no plausible threat on the horizon to the pre-launch survivability of the silo-housed *Minuteman* ICBM (Secretary of Defense Melvin Laird's claims for the counterforce first-strike potential of the SS-9 Mod 4, with 3×5 MT MIRVs, were generally discounted.[4] And – should that claim be overtaken unexpec-

tedly by events – it was argued that it was less than obvious that a theoretically vulnerable *Minuteman* should be defended: the United States could abandon her land-based missile force or seek survivability through some form of deceptive basing.

The complex deterrence stability argument against BMD referred, strictly, only to a BMD system deployed in an attempt to defend American society. Apart from its uncertain potential for expansion into a city defence scheme, the hard-point defence of ICBM silos was by definition innocent of this charge. In the late 1960s the bulk of the official US defence and arms-control community believed that strategic stability, 'a truly divine goal' as one commentator put it,[5] was logically inherent in the very character of modern weapon technology. Each super-power, it was thought, requires unrestricted military access to the societal assets of the other, while remaining unquestionably confident in the ability of its strategic offensive forces to survive a first strike by the super-power adversary. The 'stable deterrent' was the deterrent able to survive surprise attack and wreak unacceptable damage upon the adversary's society. It was believed – though the belief was based on nothing more substantial than abstract (and ethnocentric) strategic logic – that the Soviet Union would see any area defence of the American homeland as a potentially fatal challenge to her retaliatory capability, which she would have to overcome.

ABM and Strategic Logic

This strategic logic meant that BMD deployment for urban-industrial coverage would stimulate an 'offsetting' Soviet offensive response: hence, the arms-race instability. Similarly, BMD coverage of societal assets would imply a greater US willingness to break out of an acute political crisis by military means, since a President might come to believe that his country actually could wage, survive and recover from a nuclear war. By extension, it was argued that if BMD coverage of US urban-industrial targets would necessarily stimulate a Soviet offensive programme response (in order to preserve Soviet assured destruction capability), it could not fail to undermine the basis for a SALT accord. Such an accord would be negotiable only if the two sides lacked major incentives to build up their strategic offensive force arsenals.

In the late 1960s and early 1970s distinguished and technically expert strategic commentators argued, from the thesis of stable deterrence through assured vulnerability outlined above, that the strategic arms competition was a relatively straightforward action reaction process.[6] The principal prospective villain was the ABM. This view triumphed in SALT I, although Soviet motives were almost certainly different. On this thesis, if American ABM deployment were drastically curtailed the Soviet Union should lack any powerful incentive to deploy strategic offensive forces beyond those needed to cover the US urban-industrial target base (and some military targets). George Rathjens reflected this opinion in his observation that 'with the right kind of ABM agreement, incentive for either side to expand its offensive missile forces or to put MIRVs on them would be much reduced since, in the absence of concern about adversary ABM deployment, each side could be confident that it had an adequate deterrent even if it believed that a large fraction of its strategic force might be destroyed by preemptive attack'.[7]

However reasonable such expectations were at the time, the plain facts of the 1970s would appear to destroy the theory that informed this claim. The Soviet Union, in the context of the ABM Treaty, proceeded to test and deploy the kind of strategic offensive missile force that one would have expected if a serious US city BMD system had existed.[8] It might be suggested that Soviet ICBM and SLBM programmes in the 1970s would have been pursued even more energetically had the United States proceeded with BMD – and particularly with a BMD system which provided some urban-industrial coverage. However, that argument is both inherently improbable and implausible. The Soviet Union, with a diminishing rate of economic growth, has been modernizing in every category of military capability. The development, testing and deployment of her MIRV-equipped fourth-generation, ICBM (SS-16 to SS-19),[9] has constituted an investment of awesome magnitude. On the available evidence it is not obvious that the Soviet ICBM and SLBM programmes (with their nuclear warhead production requirements) could have been on a very much greater scale if the US had deployed BMD. Indeed, if the Soviet Union decided that BMD deployment required a response in kind, they might even have been smaller.

ABM Treaty of 1972 as constituting a historically definitive judgment.

The ABM Debate

The ABM debate of ten years ago involved an unhappy combination of defence doctrinal and sociological phenomena which caused the debate to become so politicized and emotional that fair assessment of the weapon system in question was very difficult. The ABM, coming up for policy decision as it did in a period of intense American introspection and self-doubt, assumed symbolic status. This was understandable, given the Vietnam-dominated domestic politics of the period, but it did little for the quality of the debate.

There was a thread of understandable confusion running through the argument which stemmed from the fact that the principal strategic mission of the system was altered very basically, even though the technology was not. On 14 March 1969 President Nixon announced the reorientation of the US ABM programme, renamed *Safeguard* (from *Sentinel*), away from the provision of 'light' or 'thin' area coverage of urban-industrial America and towards the defence of *Minuteman* ICBM silos. Although the mix of system components was different in the new hard-point defence orientation, it did not escape technical critics that *Safeguard* was being charged with a mission for which its major components had not been designed. Above all else, critics argued that the ABM system, and in particular its few missile site radars, was far more vulnerable to attack or degradation than was the target set it was defending.

Although careful defence commentators had no difficulty comprehending the possible implications of the difference between attempting to defend hardened strategic offensive force targets and urban-industrial area targets, some anti-ABM voices either failed to appreciate the difference or chose to see a silo-defence-oriented *Safeguard* as a stalking-horse for a much more ambitious deployment. The distinction between the BMD of hard-point targets (such as ICBM silos and launch-control centres) and urban-industrial targets is of fundamental importance, both for the scale of the technological challenge and possibly for the strategic consequences. Many, if not most, of the more doctrinaire anti-BMD arguments of 1969–70 related solely to city defences, not to the defence of hardened point targets.

Basically, there were five classes of anti-BMD argument advanced ten years ago:[2] these were that BMD would not work; that, whether or not it would work, it was not needed; that it would destroy the stability of deterrence (a generic charge which embraced the accusations that it would promote arms-race instability and crisis instability, and would endanger the prospects for success of the then novel SALT enterprise); that it would mean a threat to particular localities ('bombs in the back yard'); and that it was a make-work project for an alleged military-industrial complex.

The details of the debate are important, primarily in so far as they constitute, almost literally, the most recent flow of information to the American public on the subject of missile defence. The ABM Treaty of 1972, however its merits and demerits may be assessed, had the effect of taking BMD programme questions out of the mainstream of active policy discussion. So, for the better part of a decade, only a very small group of (largely technically-minded) *cognoscenti* has kept abreast of the evolution of BMD technology. The number of Western defence commentators who have continued to consider BMD programmes in policy or strategic perspective has been even smaller. It is no exaggeration to claim that the US defence and arms-control community, as a whole, has not wanted BMD to be raised again as a live policy question. BMD, even of a very restricted (e.g. hard-point defence) character, hovers on the edge of posing uncomfortably fundamental issues about the dominant society-punishment-oriented theory of deterrence.[3] BMD of any kind, would be likely to help reopen discussion of the proper relationship between deterrence and defence (or, rephrased, between deterrence by the threat of punishment and deterrence by denial). Hard-point defence should not have this effect, but the fact of BMD may be more important for the terms of defence debate than its technical character.

More prosaically, the memory of the bitterness and emotion of the 'great ABM debate' of 1969–70 was too recent to induce commentators or officials to risk inviting a replay. Fortunately, from this point of view, the ABM Treaty served as a plausible partial alibi for silence on, and apparent indifference to, BMD policy questions.

A New Debate on Ballistic Missile Defence

COLIN S. GRAY

Ten years after the anti-ballistic missile debate of 1969–70, the strategic environment has changed enough to suggest to many commentators the need for ballistic missile defence (BMD) technologies. A new debate over the merits of different kinds of BMD is coming, but the terms of that debate are largely unformed. As of 1981, there are more than sufficient grounds for re-opening a policy debate not only about BMD's possible merit for stabilizing the Soviet–American strategic balance according to the criteria of mutual assured (societal) vulnerability, but also about the fundamental wisdom of the offence-dominance which has characterized US strategic doctrine and posture for the better part of fifteen years. This latter issue bears directly upon philosophies of deterrence, as well as upon the relevance of US capabilities to possible foreign-policy needs and the compatibility of US nuclear strategy with American values.

This article does not argue that the anti-ABM coalition of ten years ago was wrong, that the 1972 ABM Treaty was a mistake, or that the United States should hasten to invest heavily in BMD systems for the 1980s and 1990s. All it argues is that the strategic world, and much of informed Western opinion about it, has changed so markedly since the very early 1970s that, given the inherent importance of the subject, the question of the policy relevance of BMD of different kinds should be raised anew. The ultimate conclusion might possibly be that BMD would create more problems than it would solve. Nonetheless, that possibility does not dismiss the case for reassessment.

The ABM debate of the late 1960s and the very early 1970s encouraged polarization of opinion and opened wounds within the American defence community which have yet to be healed fully. No effort is made here to offer retrospective wisdom on the policy positions taken ten years ago, since it is assumed that both pro- and anti-ABM spokesmen in the *Nike X-Sentinel-Safeguard* debate argued honestly and took positions that seemed reasonable at the time. The important issue is whether or not times have changed to such a degree that some policy positions which were reasonable in 1970 are no longer so reasonable in 1981.

Although some of the more important questions posed here require answers that inherently transcend the available evidence – such as, 'what is an adequate deterrent in Soviet perspective, and is that Soviet idea compatible with a US definition of an adequate deterrent?' and 'how far would US self-deterrence devalue the currency of intended deterring threats?', much of the basis of a responsible debate on the future policy relevance of BMD is a matter of fact rather than judgment. For example, the BMD technologies which the United States (and NATO, with American assistance) could deploy in the 1980s and 1990s have little in common with the *Safeguard* ABM technology that was debated in 1969–70. Moreover, our knowledge of Soviet 'strategic culture',[1] and of Soviet strategic 'style' in arms competition, has undermined the plausibility of a good many of the anti-ABM arguments popular ten years ago; and the disadvantageous evolution of the multi-level military balance in the 1970s, in an era characterized by intensive arms negotiations, has cast significant doubts upon the value of a Western concept of strategic stability born in an era of US strategic superiority. In short, BMD technology has changed, Western understanding of the Soviet Union has changed, and Western appreciation of what is, and is not, an adequate strategic concept, has changed. In these very general terms, at least, it may be claimed that it would be inappropriate to view the negative decision on BMD enshrined in the

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declares that the Soviets will interpret our deployment of a BMD as a rational move for a country not seeking a first strike capability. Deployment of a BMD would be a responsible action by a country trying to take precautions against an adversary. Lack of a US BMD may be interpreted by the Soviets that the US is building a first-strike capability that can and may be successfully employed.

Mr. Gray concludes that a BMD potentially offers enough to the security of our nation to reassess the merits and drawbacks of a BMD. His article was copied from the March-April 1981 issue of Survival and starts on the next page.

ARTICLE TWO - "A NEW DEBATE ON BALLISTIC MISSILE DEFENCE"

The author of "A New Debate on Ballistic Missile Defence" is Colin S. Gray. Mr. Gray is president of the National Institute for Public Policy and is a member of the General Advisory Committee on Arms Control of the Arms Control and Disarmanment Agency (6:70). He was Director of National Security Studies at Hudson Institute, New York when he wrote this article in 1981 (5:60). Prior to working at National Security Studies, Mr. Gray was Assistant Director of International Institute for Strategic Studies in London (15:Back Cover).

Mr. Gray attempts to present an objective review of the debate on BMD in the late 1960s and last decade. He provides an excellent explanation of many of the pros and cons of a US BMD stated by commentators in that time period. For example, he cites the rationale that a BMD is more cost effective than adding more offensive weapons or protective shelters to preserve the uncertainty of the location of the M-X missile. In another example, he raises the issue that a BMD would reduce fatalities, and that a BMD causes the Soviets uncertainty in their war planning. Many of those same views or rationale are stated today as valid reasons for a BMD. Mr. Gray does balance his article by presenting the views of the critics of a US BMD. By taking this approach, he allows the readers to make their own conclusions regarding the validity of a BMD in the US in the past and to apply some of those arguments for the 1980s. Mr. Gray expands on the rationale for a BMD in his section on policy issues.

In the section on policy issues, the author, through the stimulation of questions, cites five potential reasons for developing and deploying a BMD in this decade. First, the US strategic nuclear forces are losing the credibility to deter the Soviets. Second, American deployment of a BMD may encourage the USSR to discontinue their offensive nuclear force buildup. Addition of a US BMD would convince the Soviets that deploying more offensive nuclear forces was useless because US retaliatory capability would exist after an attack. Third, a US BMD may stimulate a defensive weapon system competition with the USSR. Spending money on defensive forces by the two superpowers would draw funds away from dangerous offensive nuclear weapons. He believes this competition would make the world a safer place by reorienting the nations to work on defense of the homeland. The fourth reason for a BMD has already been documented in this anthology. If a nuclear war does occur, the country will want as much physical protection as possible. Fifth, deployment of a BMD conveys to the USSR that the US is preparing for the possibility of war, not preparing for premeditated war. Gray

in the expectation that firm and effective limits could be established on offensive forces. The strategic environment that looms ahead in the 1980s defies that expectation. Nevertheless, arms control arrangements can be in the American interest; the task for U.S. policymakers is to adjust the sights of arms control policy to the world as it is. If a BMD system were developed and available for deployment during the 1980s, it could contribute to the establishment of an environment that is amenable to a renewed arms control dialogue. It can be postulated by now that the prospects for equitable arms control will brighten only at the point when the Soviet leaders come to the realization that their massive investment in ICBM forces are no longer likely to be productive.

Keeping the BMD option open does impose certain criteria on the U.S. force modernization effort. Thus, land-based forces should be designed in a manner that is compatible with a possible, effective BMD deployment. This would, for example, render inadvisable systems which depend on tactical warning for their survival (e.g., air-mobile ICBM deployments).

Looking more deeply into the future, an enlarged role for BMD in U.S. strategic doctrine and modernization objectives may lead to the eventual restoration of a healthier balance between offensive and defensive weapons. The assumptions that have induced the United States to abjure a defense against ballistic missiles can be shattered by any number of events, such as heightened Soviet belligerence and/or a spate of nuclear proliferation over the globe. It seems unlikely that a world which could be shocked by the terror bombing of Guernica will long tolerate the permanent holding of its civilians as hostages to nuclear attack. While a full-fledged shift toward an active defense posture may be implausible during this decade for want of suitable technology, American policy can at least make ready the initial stepping stones for such a shift.

NOTES

1. A well-informed review of the linkage between the 1969 ABM debate and the current defense policy debate may be found in S. Rosen, "Safeguarding Deterrence," *Foreign Policy*, Summer 1979.

2. See *John Newhouse, Cold Dawn: The Story of SALT* (New York: Holt, Rinehart and Winston, 1973).

3. U.S. Senate, Committee on Foreign Relations, Subcommittee on International Organizations and Disarmament, *Strategic and Foreign Policy Implications of ABM Systems, Hearings*, 91st Congress, 1st Session (Washington, D.C., Government Printing Office, 1969).

4. See for example, Paul H. Nitze, "Deterring Our Deterrent," *Foreign Policy*, Winter 1976–1977.

5. A review of U.S. modernization programs and objectives can be found in Harold Brown, *Department of Defense Annual Report, Fiscal Year 1981* (Washington, D.C., Government Printing Office, 1980).

6. A detailed description of the MX system as currently discussed can be found in Colin S. Gray, *Strategy and the MX ICBM* (Washington, D.C., The Heritage Foundation, 1980), and D. Griffiths, "MX Flexibility Allows Doubling of Shelters," *Aviation Week and Space Technology*, September 17, 1979.

7. The SALT II constraints did not achieve limits on ballistic missiles, only on their launchers. As a single silo launcher could fire several missiles, the value of the launcher limitation was modest. The Soviet demonstration of MIRV "bus" stationing of up to 14 reentry vehicles (although only 10 were actually released from the "bus") diminished confidence that the SALT limit of 10 reentry vehicles per SS-18 could be monitored by U.S. national technical means of verification.

8. For a review of this issue, see I. P. Hoeber, *Slow to Take Offense: Bombers, Cruise Missiles, and Prudent Deterrence* (Washington, D.C.: Georgetown University Press, 1977).

9. The shift in emphasis from penetration of Soviet air space to the standoff delivery of cruise missiles reduces the Soviet air defense burden away from terminal surface-to-air missiles toward the use of SLBMs against bomber bases and long-range air-to-air interceptors to attack the cruise missile carrier before the missiles can be launched.

10. See Donald Rumsfeld, *Department of Defense Report, Fiscal Year 1978* (Washington, D.C.: Government Printing Office, 1977).

11. Albert Wohlstetter, *Legends of the Strategic Arms Race* (Washington, D.C., United States Strategic Institute, 1975).

12. The "leverage" gained in applying BMD arises from the tactic of "preferential defense" where the location of the ABM interceptor(s) and the MX missile is concealed within a set of 23 shelters. If two interceptors are provided for each of the 200 missiles within a 4,600 shelter complex, then the Soviets would have to allocate three warheads per shelter to assure the destruction of a single MX missile. If two warheads per target were required, then an additional 4,600 warheads (for a total of 18,400) would be required. In practice, the actual leverage may not be as high, but the level of uncertainty faced by the attacker is *very* high – a desirable property to maintain deterrence.

13. A useful description of the state of current BMD technology may be found in BMD-related testimony before the Committee on Armed Services of the U.S. House of Representatives and the Subcommittee on Defense of the Committee on Appropriations of the U.S. House of Representatives in connection with the FY 1981 Defense budget.

prospects of it) would make the incentives for ballistic missile defense compelling.

In the meantime, the design of the MX system is compatible with a possible subsequent decision by the United States to deploy a ballistic missile defense system to protect the MX missiles—*for the event that the eventual number* of deployed Soviet reentry vehicles were to overwhelm the practical limits of passive defense (i.e., the construction of additional shelters). The arithmetic in this respect is simple and persuasive. If the United States were to deploy 400 ABM interceptors to protect an MX force of 200 missiles in a system of 4,600 shelters, the Soviets would need 13,800 warheads to threaten the force—that is, if they allocated but a single reentry vehicle to each MX shelter. If the number of shelters were increased to 9,200 (the maximum currently envisioned within the proposed scale of the land acquisition), the number of Soviet reentry vehicles would have to be doubled. But normal targeting prudence would call for *two* reentry vehicles aimed at each shelter. Thus, such a combination of passive and active defenses of the MX would push a viable Soviet attack on the system beyond the realm of the feasible.[17]

This kind of elementary arithmetic forms an ever more significant background to the debate over the modernization of U.S. strategic forces. If a BMD system were *credibly available for deployment*, it would threaten to "pull the rug from under" the Soviet strategic modernization effort. The Soviets could concede little purpose to a continued build-up of reentry vehicle loadings that even under the best of assumptions would fall short of a viable threat to U.S. ICBMs. Mustering the potential of a BMD system thus augurs as the best hope for restoring measures of stability to the Soviet-American arms competition and providing an environment wherein arms control can become a fruitful exercise.

The Potential of Ballistic Missile Defense in the 1980s

The new role of BMD could not have been forecast a decade ago—but then a number of old assumptions have foundered in the rapid tides of technological advance. One of the prominent victims is the assumption that superpower stability can somehow be built upon a balance of strategic offensive power.

It seems clear that the staggering magnitudes of strategic offensive weaponry predicted for the next two decades will tax any lingering notions about effective arms control management *of arsenals of that size*. The development of technically feasible BMD systems does point to a possible direction for the Soviet-American arms competition in which the potential for conflict can be constrained and perhaps diverted. In the more immediate future, as has been noted, the very prospect of a credible BMD for the protection of land based strategic offensive forces may provide the incentive for a return to the negotiating table.

It needs to be emphasized that what is proposed here is *not* a sudden "overturning of the applecart"—e.g., a unilateral abrogation by the United States of the 1972 ABM Treaty, which will come up for review in 1982. What is urged, rather, is simply the *development*—up to the threshold of deployment—of a BMD system that has a capability to assure the survival of land-based strategic forces.

Such a development effort is within the grasp of the United States, because the basic components of the system are generally at hand; they represent evolutionary improvements of the Safeguard ABM system, the deployment of which was abandoned in 1972 when the ABM Treaty was signed.[18] Already well-advanced in research and development, the so-called Low Altitude Defense System (LoADS) promises the nucleus of a credible ability to defend a land-based ICBM system deployed in a multiple protective structure (as is the proposed MX system).

The present and projected funding levels earmarked for development of the LoAD system would not permit its deployment until the late 1980s. But if the R&D effort were accelerated to convey U.S. determination to make the system available for possible deployment at an earlier date, the demonstration may be enough to discourage a surge of Soviet investment in fifth generation ICBMs (which systems are likely to be tested in 1980–1981). If the Soviets were to go ahead with such an investment, the extremely high reentry vehicle loadings forecast in the recent National Intelligence Estimate could well become a reality.

The ABM Treaty was ratified by the Congress

alternative to phasing the vessels out of the force is to rehabilitate them via a service life extension program (SLEP) similar to the one now being conducted for the attack carrier, the U.S.S. *Saratoga*. Even if this can be successful, however, the submarines will still be unable to accommodate the most advanced missiles. Therefore, a reduction in the overall capability of the sea-based force is inevitable.

Land-based Missile Systems. By far the most attention has been lavished on the future of the land-based ICBM force. As early as the mid-1960s, predictable improvements in the delivery accuracy of ICBM warheads cast doubt on the long-term viability of fixed-point ICBMs. Yet, the threat emerged even more swiftly than expected with the simultaneous advent of multiple warhead missiles and the improvement by an order of magnitude in the accuracies of ballistic missiles over the earliest ICBMs.

By 1976, an orderly program was at hand to permit a shift from fixed-point ICBMs to a more secure basing mode: namely, the initiation of full-scale engineering development of the MX ICBM in FY 1978, with a planned initial operational capability date of FY 1983.[10] This projected pace of development and deployment would have permitted the shift from fixed-point ICBMs to a more survivable basing mode to take place coterminous with the emergence of the threat to the U.S. ICBMs.

Yet, arms control initiatives by the United States had the effect of stalling progress on the MX. Full-scale engineering development of the missile and basing mode was halted, and a bewildering series of alternative basing modes was studied and reviewed. The hope (starting with the March 1977 mission to Moscow by Secretary of State Cyrus Vance) that an agreement could be reached in the Geneva SALT negotiations that might somehow obviate the MX deployment contributed to a three-year delay in the resumption of full scale engineering development of the missile system. The IOC was moved back three years to FY 1986. At the same time, the intelligence estimates which had informed the original FY 1983 target date for the MX IOC had to be revised upward. Soviet flight tests in 1977 and 1978 of the SS-18 Mod 4 and the SS-19 Mod 3 revealed that the threat to U.S. land-based ICBMs would emerge sooner than expected—perhaps as early as 1981.

The Emerging Strategic Equation

For the first time since 1972, the subject of a possible role for ballistic missile defense in U.S. strategic force modernization has begun to enter the strategic dialogue in the United States. The discussion is focusing on BMD not as a cure-all for the widening strategic vulnerabilities of the United States, but rather as an important hedge against a future made all the more uncertain by the continuing thrust of the Soviet offensive weapons build-up and the murky outlook for arms control.

The prospects, in somewhat simplified terms, are as follows. The number of shelters (4,600 to 9,200) proposed for basing the MX would be sufficient to offset the anticipated number of Soviet reentry vehicles likely to be deployed by the mid-1980s. Yet, the confidence that one can muster in predicting the size of Soviet offensive capabilities in the late 1980s and beyond has to be frail. U.S. intelligence estimates of Soviet strategic force objectives have consistently fallen short of eventual Soviet deployments.[11]

The character of Soviet force growth clearly will be dependent also upon the incentives offered by the target structure in the United States. The delays and uncertainties in the U.S. decision to deploy its ICBMs in a more survivable basing mode encourages the Soviets to concentrate their strategic forces investment in land-based systems capable of knocking out vulnerable U.S. ICBMs. Moreover, it is clear in retrospect that as the United States elected to limit its own ability to target Soviet fixed-point systems (thus, for example, the United States decided to equip only 350 of its 550 Minuteman III missiles with advanced Mark 12A reentry vehicles), the Soviets had much to gain from both their arms control posture (eschewing limits on heavy missiles) and their strategic force modernization effort. The combination of the slow pace of U.S. modernization and the failure by the United States to evolve an ability to limit damage from Soviet ICBMs provides the Soviets with ample incentive to avoid negotiated restraints on their forces.

The consequences of a Soviet-American strategic arms competition at very high levels of strategic weapon loadings (e.g., upwards of 15,000 reentry vehicles) are difficult to foresee. Almost certainly, however, such an escalation of the weapons competition (or even the

of the nearly simultaneous emergence of varying degrees of vulnerability in the several components of U.S. strategic forces. As was originally planned, all elements of U.S. strategic offensive forces were to enter modernization in 1977. This process was delayed and significantly altered under the Carter Administration in deference to arms control priorities, as well as an apparent personal, emotional reluctance by President Carter to sponsor sweeping improvements in U.S. nuclear weapon delivery systems.

Air-Breathing Systems. The modernization of the air-breathing element of U.S. strategic forces proved to be the most controversial when the salient part of the program—the replacement of the B-52 series bomber with the B-1—was peremptorily canceled by the Carter Administration. As an alternative, the Administration proposed to replace existing "stand-off" missiles on strategic aircraft with a modern cruise missile. Thereupon the air-launched cruise missile (ALCM) swiftly became enmeshed in the web of arms control: for nearly two years the United States offered to limit the range of the ALCM to 2,500 kilometers, and the development of the new missile was delayed as a result. In any event, the key significance of the Carter decision was that the ALCM, rather than a supporting element in the modernization of the air-breathing forces, became in effect a *substitute* for a new penetrating bomber.[8]

The effects of this decision on the potency of U.S. strategic forces in the 1980s is significant: with the cancellation of the B-1 approximately 40 per cent of the strategic force megatonnage programmed for deployment in the 1980s was eliminated. Moreover, the failure by the United States to forge ahead in the penetration capabilities of its bomber forces against ever more sophisticated Soviet defenses portends the inevitable phasing-out of the existing force of B-52 and FB-111 bombers, and sole reliance on the ALCM. While this gap in U.S. offensive capabilities may not be felt in the early 1980s, it will become ever more significant in the latter part of the decade—especially to the extent that the Soviets channel away their investments from the difficult and costly task of modernizing their area and terminal defenses against the penetrating bomber to the less challenging mission of engaging the stand-off cruise-missile-carrying aircraft.[9]

The scope of the problem was exacerbated by the fact that arms control limitations accepted by the United States imposed significant constraints on cruise missile deployments, but none on Soviet air defenses against the cruise missiles. In general, it seems that the Carter Administration had concluded that the air-breathing element of the U.S. strategic triad made only a peripheral contribution to deterrence, and thus could be given a secondary role in the modernization picture.

Sea-Based Systems. The modernization of the sea-based systems was scheduled to be taken up *seriatum* in an effort spanning two decades. First, some of the Poseidon submarine-launched ballistic missiles (SLBMs) were replaced with the longer-range Trident I missile. Although the new missile would reduce the vulnerability of the submarine to several types of anti-submarine warfare technology (due to the larger patrol area made possible by the missile's longer range), a payload penalty was paid in terms of the maximum number of warheads that could be loaded on each missile.

The second phase of the modernization effort was the construction of a new series of submarines (Ohio-class) which would increase the number of missiles carried per submarine from 16 to 24. The third phase of the modernization effort was to be a new long-range SLBM, the Trident II. The warhead loadings of the Trident I would be maintained, but the new missile would be more accurate and allow a significant gain in survivability through an even greater enlargement of the patrol area. The complete modernization of the sea-based element would not be completed until the mid-1990s.

But the delays in the sea-based modernization program already have created difficult short-term problems. The older Polaris-class submarines will reach the end of their service lives by the mid-1980s (three submarines are already out of service). As a result, the total force of U.S. SLBMs will decline by one third in the mid-1980s, unless the existing systems are replaced or their service life extended.

The problem is particularly acute with respect to the ten older Polaris-class submarines, because their launch tubes will not accommodate the Trident I missiles. Unfortunately, one promising proposal—to equip those submarines with 80 cruise missiles—has been rejected on arms control grounds. The only remaining

accuracy and greater-than-expected increases in the numbers of Soviet reentry vehicles. The only significant passive technique for enhancing the survivability of U.S. ICBMs was a modified form of mobility whereby the precise position of an ICBM could be obscured through the concealment of a small number of missiles (approximately 200) in a large number of shelters (more than 9,000). To shorten a very long and technically complex story: the search for the least costly "good-enough" solution to the ICBM vulnerability problem seems to have reached a conclusion in the proposed mobile deployment of the MX missile. But one penalty that has already been incurred is a delay in the initial operational capability (IOC) of the MX system from fiscal year 1983 to 1986.[6]

The costly delays in the decision to begin engineering development of the MX system offer testimony to the painful evolution of U.S. assumptions about the strategic environment of the 1980s. It needs to be recalled that the provisions of the SALT Treaty, the ratification of which by the U.S. Senate has been suspended in the wake of the Soviet invasion of Afghanistan, established a "baseline assumption" about the character of the Soviet threat in the 1980s. The "SALT-denominated" threat for the mid-1980s consisted of a Soviet inventory of ICBM reentry vehicles in excess of 6,000, more than half of which would be capable of counterforce missions—i.e., able to be targeted against U.S. ICBM silos. This figure exceeds by more than a factor of two the forecasts that had been made in the early 1970s.

As the SALT II Treaty received increasing scrutiny in the course of the ratification process in Congress, the efficacy of the limits ostensibly imposed by the Treaty on Soviet strategic offensive capabilities grew progressively doubtful, especially as they pertained to the loadings of reentry vehicles. The ability of the Soviets to boost the reentry vehicle loadings on their heavy SS-18 missile by up to 40 per cent, combined with their proven capacity to fire multiple missiles from the same launcher via the "cold-launch" process, seriously devalued the limitations that had been negotiated in SALT II.[7] According to press reports, a recent National Intelligence Estimate (NIE) for the late 1980s projects reentry vehicle loadings in Soviet forces at 15,000 or more – double the estimate of the late 1970s.

That such gross changes in the strategic environment could confound U.S. intelligence estimators is significant in and of itself. The predicament, however, has been compounded by the lack of any real changes in the substance of U.S. strategic doctrine and policy that could allow the strategic modernization programs of the United States to adjust to the realities of the 1980s. This predicament can be summarized as follows:

- The Soviet Union does not share the U.S. concept of parity in defining its force acquisition objectives.
- The expectation embraced by American policymakers, that SALT would be an effective means of constraining the growth of the Soviet strategic offensive force, can no longer be sustained.
- The notion that the Soviet Union had *de facto* accepted American concepts of mutual vulnerability by acquiescence in the ABM Treaty is contradicted by the scope of the continuing Soviet modernization program.
- The arms control/strategic doctrine developed during the 1960s and implemented in U.S. policy during the 1970s will be incompatible with the international environment of the 1980s, where force levels may exceed forecasts of a decade earlier by an order of magnitude.

The U.S. Strategic Modernization Program

The modernization of U.S. strategic forces has been driven both by changes in the threat posed to U.S. forces, as well as by the constraints of the arms control environment. Each has impacted directly on the character of the U.S. modernization effort, but arms control constraints clearly have predominated in the past several years. Notwithstanding the changing threat, the U.S. modernization program has reflected commensurate changes in neither strategic objectives nor targeting doctrine (although the latter has undergone careful review since the mid-1970s). According to most important aggregate indices (e.g., equivalent megatons), U.S. strategic force loadings will decline during the 1980s and 1990s.

The modernization of U.S. strategic forces has loomed as a comprehensive task because

The technologies outlined above are those which the American BMD community believes, with more confidence (LOADS) or less (exoatmospheric 'homing' overlay), that it knows how to bring to operational reality in the 1980s and early 1990s. Beyond these basically conventional technologies lies the 'exotic' realm of directed-energy BMD systems. In time some of these are virtually bound to be very attractive candidates for deployment – almost certainly on space platforms. Space-based high-energy laser systems, designed to destroy ICBM and SLBM in their boost phases, could easily mark a historical change in the relationship between the offence and the defence in favour of the latter. However, major practical problems remain to be solved, and the United States (and presumably the Soviet Union) have scarcely even embarked on a laser versus laser counter-measures competition. This is not to dismiss directed-energy BMD – simply to be cautious about when it will become feasible.

What BMD Can Do

Predicting, even with modest confidence, that it will be technically feasible to accomplish certain BMD tasks is not, of course, the same as believing that they should be done. Moreover, just as no weapon is inherently invulnerable (probably not even SLBM-carrying nuclear-powered submarines,[20] so no active defence system can be said to be likely to 'work' *in vacuo*, regardless of the scale and sophistication of the threat. Before probing the crucial question of policy desirability, it is probably useful to summarize what the currently predictable technical facts seem to indicate as feasible.

They show, with very high confidence, that LOADS ought to be able to defeat a Soviet attack upon deceptively-based ICBM. Indeed the cost-effective leverage it could achieve should (though it may not) discourage any Soviet attempt to defeat the joint deployment of shelter-based ICBM and LOADS by increasing the number of attacking warheads launched. Strictly speaking if US strategic arithmetic is correct, LOADS would not be needed to defeat a Soviet threat of much less than 12,000 re-entry vehicles, since, (assuming a potential for shelter expansion) the MX deceptive basing structure alone could cope with such an attack. Pursuing a competition which involved 23 or more warheads to ensure saturation of an MX complex defended by one interceptor would be unlikely to appeal to competent Soviet defence planners.

LOADS could be relevant to the defence of any hardened facility, not only of ICBM shelters. However, LOADS derives its extraordinary leverage from the nature of the deceptively-based ICBM scheme which permits preferential defence. The low altitude of LOADS target engagement and interception is a virtue in the defence of hard targets, because it permits both very high-quality aim point prediction (so that interceptors are not wasted on warheads directed against empty shelters) and confident discrimination between real re-entry vehicles and decoys. However, the low altitude of engagement prevents the system, as currently planned, from being relevant to the defence of such soft targets as air bases or urban areas.[21] It is also worth mentioning that, because of the synergism of deceptive ICBM basing married to preferential BMD, deploying LOADS with MX *from the outset* would permit a considerably less extensive and cheaper MX missile and shelter system. Indeed, it could be argued that the overall cost of deceptively-based MX with LOADS, as opposed to deceptively-based MX alone, might be up to 30% less for similar operational effectiveness measured in terms of surviving warheads. For the active defence of fixed targets of known location – such as current ICBM silos, air fields, command, control and communications (C^3) centres and the like – it would be almost essential to have a multi-level BMD system embracing an exoatmospheric 'overlay' scheme, such as the one outlined above, plus a BMD deployment capable of interception in the atmosphere (though, in many cases, at a higher altitude than is intended for LOADS).

The 'overlay' system could provide a very valuable thickening for the LOADS defence of hard targets, could provide a thin area coverage of much of the continental US, or could even offer the prospect (in conjunction with a lower-level BMD interception scheme for much reduced 'leakage') of making truly dramatic inroads into the weight of large-scale attacks against urban-industrial America. Population fatalities are related fairly directly to the quantity of megatonnage delivered. An 'overlay', plus lower level atmospheric BMD, could massively reduce the deliverable megatonnage by means of both

successful interception and the so-called 'virtual attrition' caused by the expenditure of scarce Soviet missile payloads upon technology intended to defeat the defence).

It is possible to invent threats which could defeat a BMD system. Both LOADS and the 'overlay' system described here have easily identifiable potential technical problems. LOADS would have to function in an extremely severe nuclear environment. Perhaps its components would prove to be insufficiently hardened against weapon effects, or the system might lose its 'leverage' potential if the USSR uncovered the deception code governing the movement of MX missiles. Similarly, the 'overlay' system might be defeated by cleverly designed decoys or by manoeuvring re-entry vehicles. However, Soviet defence planners cannot organize such vulnerabilities cheaply or reliably.

Probably the single most telling argument for BMD deployments of the kinds discussed here is that – almost regardless of their precise mission – they must reduce the operational confidence of the offence. Deterrent effect is in good measure the product of sensible uncertainty,[22] and BMD adds major technical and operational uncertainties to offensive tasks that are not certainly achievable anyway. The more 'clever' and sophisticated an attacker has to be in his planning, the more there will be that could go wrong. Short of actual trial by battle, Soviet military technologists could not be *certain* that their BMD penetration technology and tactics would function well.

Policy Issues

The range of active defence options for the 1980s and 1990s raise policy issues that cannot be ignored. The revolution in optical discrimination, when added to the progress made in rapid data processing and the hardening of radars, means that opposition to BMD on the grounds that it will not work has weakened very appreciably. Furthermore, in the context of defensive tactics involving preferential protection, the use of two different methods of target discrimination (long-wave infra-red optical sensors in outer space and by radar within the atmosphere) means that fairly casual references to the growth of the Soviet threat (in quantity and quality) can no longer suffice to forestall a serious policy debate on the merits of deploying ballistic missile defence.

Given the above assessment of the feasibility of different kinds of non-exotic BMD systems, five broad political-strategic questions should be prominent in the new BMD debate of the 1980s. First, is it reasonable to believe that area BMD could contribute very usefully to deterrence? If 'thinly' deployed, area BMD might function as a 'firebreak', denying the USSR a very low-level response to a US strategic nuclear initiative but sufficing to deny any other country ballistic missile access to the American homeland. The 'firebreak' theory may have some merit, but it is vulnerable to the arguments that 'thin' area BMD might mislead some officials into believing that the world had become much safer for small-scale central war, and in any case small-scale nuclear strikes are not much in keeping with what is known about Soviet military style.

A better case for area BMD rests upon the proposition that a 'thick', or truly serious, multi-level deployment would usefully reduce American self-deterrence and so enhance the credibility of the extended deterrent. The American (and Western) defence community continues to ignore the plain fact that, in the absence of substantial homeland protection, US strategic nuclear forces lack both credibility as an extended deterrent threat and ability in the event of need.[23] The Soviet Union cannot be certain that this is so (even incredible threats deter to some extent) but the required quality of deterrence, its robustness in periods of very acute political stress, could well be lacking if the US homeland continues to be totally at nuclear risk.

Second, is it possible that BMD, of both hard targets and urban-industrial areas, might serve to encourage arms-race stability? The pace and quality of Soviet offensive force deployments over the past decade can probably be explained in terms of some combination of defence-industrial momentum and anticipated war-waging (and hence, in Soviet eyes, deterrent) benefit. The manifest arms-race instability that has characterized the SALT (and ABM Treaty) era flows from the fact that the Soviet Union genuinely believed she could derive prospective military-political gain from pressing ahead with new offensive systems. American deployment of BMD technologies like those discussed above might serve to discourage her from continuing the course she has followed in recent years. At the very least, Soviet defence planners would

have to judge serious US BMD deployment as reducing, and perhaps drastically reducing, the anticipated military-political returns from (some) offensive weapon programmes.

The undeniable facts of the strategic arms competition in the 1970s demonstrate that the absence of BMD has been fully compatible with an increasingly unstable strategic balance. The long-familiar claims that US BMD deployment would be futile and would contribute to instability lack obvious credibility. BMD deployment need not be futile – a capable technology could actually defend what it was designed to defend with an acceptable failure rate. Even if the Soviet Union tried to respond to the BMD deployment so as to negate it, she might not be able to do so. Moreover, area BMD focused upon the defence of American society may be far less liable to stimulate the arms race than generally is believed. As noted above, it is generally acknowledged today that the Soviet Union does not adhere to any known concept that resembles assured (society) destruction. Indeed, her civil defence programme, albeit of uncertain effectiveness, attests her lack of interest in the concept of *mutual* assured destruction at least. The Soviet government may well prefer US society to be unprotected, but that need not, and should not, serve as guidance for American defence policy.

Third, is it not possible that US BMD, of hardpoints or of society at large, would stimulate the USSR into opening an arms competition in defensive systems? This has to be judged a distinct possibility. However, it would not obviously be undesirable. The Soviet Union does not have infinite resources to invest in strategic forces. Roubles devoted to the active defence of Soviet cities (and other economic targets) would be roubles not expended upon offensive systems that could kill Americans, or upon general-purpose forces that could seize territory. The SALT process, of which the surviving monument is the ABM Treaty, has virtually licensed a massive build-up in offensive forces. A BMD competition, oriented towards the defence of those targets that neither side should have much interest in actually striking (cities and other economic assets), could herald a long-overdue trend towards a somewhat safer world. However, the United States would certainly wish to be able to penetrate Soviet BMD of some kinds of targets. An important element in a renewed BMD debate should be consideration of the net benefit, or possible net loss, to US security in the context of bilateral BMD deployments.

Fourth, how valuable might BMD be if deterrence either failed or was irrelevant? As Fred Ikle suggested in an important article in 1973, it is probably unreasonable to expect nuclear deterrence to work indefinitely.[24] Even skilled high-wire artists believe in safety nets. The probability of deterrence failure cannot be estimated – it may be very small – but highly improbable events do occur. If deterrence failed (and BMD, by its modest enhancement of the credibility of nuclear threats, should help to prevent this), a US President would very quickly discover that he was really very interested in intelligent war plans and in the physical protection of the United States – and scarcely at all in the punishment of Soviet society.

Finally, what message would US BMD deployment be likely to convey to Soviet leaders? This kind of question touches on the area of US defence thinking that has long been the weakest: the understanding of the adversary. Many people still believe that area BMD deployment would be politically provocative and destabilizing, because it would allegedly be interpreted by the Soviet Union as a signal that the United States was planning and preparing to wage war. All that need be answered to this and similar points is that the USSR has always viewed defensive preparation as constituting little more than common sense, reflecting responsible precautionary official behaviour. Preparing for the possibility of war is different from planning and preparing for premeditated war. Withdrawal from the ABM Treaty, if followed closely by steps to begin deployment of LOADS, should not, of course, carry any implications of 'war-waging' intentions.

Moreover, the Soviet Union might actually be reassured to see the United States building active homeland defences. US area BMD deployment carries with it the clear implication that the United States anticipates the possibility, indeed probability, of having to withstand a major attack on her society in the event of war. In Soviet eyes a United States whose homeland is naked of civil defence, BMD or noteworthy air defence, could be a United States that is (foolishly?) confident of achieving near-total first strike offensive success. In addition, a

United States seen to be investing in BMD protection of her society might well appear to Moscow as a United States resolute and responsible in her approach to her international and national security duties.

On balance there is a strong case for reassessing every important aspect of BMD. Ideally, that exercise, which already is beginning in a modest way, should be approached in the spirit of a *net* assessment. That is to say, not merely should the possible merits and perils of BMD for the United States be considered, but so also should the merits and perils of continuing down the now traditional path which is dominated by offensive weapons.

1981 is an unusually appropriate year for a new BMD debate. SALT II, which amounted to recognition of the offensive-forces arms competition much as before, is virtually defunct; the ABM Treaty is due to receive its second quinquennial review in 1982, and the new US Administration has time for careful reassessment of its attitude to the ABM Treaty before the 1982 deadline; competent-looking BMD technologies are maturing; and there has been an almost revolutionary sea-change in the quality of American understanding of Soviet defence philosophy. It is worth recalling the words Donald Brennan wrote in 1969: 'I do not believe that any of the critics of BMD have even the beginnings of a plausible program for achieving major disarmament of the offensive forces by, say, 1980. Many of them seem committed to support forever a strategic posture that appears to favor dead Russians over live Americans. I believe that this choice is just as bizarre as it appears; we should rather prefer live Americans to dead Russians, and we should not choose deliberately to live forever under a nuclear sword of Damocles.'[25]

NOTES

[1] See Jack L. Snyder, *The Soviet Strategic Culture: Implications for Limited Nuclear Operations*, R-2154-AF (Santa Monica, Cal.: Rand Corporation, September 1977).

[2] The ABM debate generated a vast literature. Particularly useful on its details are: *Strategic and Foreign Policy Implications of ABM Systems*, Hearings before the Senate Committee on Foreign Relations, Subcommittee on International Organization and Disarmament Affairs, US Congress, 91st Cong., 1st sess. (Washington: USGPO, 1969), 3 parts; Abram Chayes and Jerome Wiesner (eds), *ABM: An Evaluation of the Decision to Deploy an Antiballistic Missile System* (New York: Harper and Row, 1969); Johan J. Holst and William Schneider, Jr (eds), *Why ABM? Policy Issues in the Missile Defence Controversy* (New York: Pergamon, 1969); Edward R. Jayne II, *The ABM Debate: Strategic Defence and National Security* (Cambridge, Mass.: Center for International Studies, MIT, 1969) (for the story up until the *Sentinel* decision announcement of September 1967); Ann H. Cahn, *Eggheads and Warheads: Scientists and the ABM* (Cambridge, Mass.: Science and Public Policy Program, Center for International Studies, MIT, 1971); Benson D. Adams, *Ballistic Missile Defense* (New York: American Elsevier, 1971); and Ernest J. Yanarella, *The Missile Defense Controversy: Strategy, Technology, and Politics, 1955–1972* (Lexington, Ky.: University Press of Kentucky, 1977). An excellent retrospective analysis is Keith B. Payne, *The BMD Debate: Ten Years After*, HI-3040/2-P (Croton-on-Hudson, New York: Hudson Institute, October 1979).

[3] Which is not to claim that actual US strategic targeting has been so dominated. See Henry S. Rowen, 'The Evolution of Strategic Nuclear Doctrine', in Lawrence Martin (ed), *Strategic Thought in the Nuclear Age* (Baltimore, Md.: Johns Hopkins UP, 1979), pp. 131–56; and Harold Brown, *Department of Defense Annual Report, Fiscal Year 1981*, 29 January 1980 (Washington DC: USGPO, 1980), pp. 66–7.

[4] See Melvin Laird's testimony in *Intelligence and the ABM*, Hearing before the Senate Committee on Foreign Relations, US Congress, 91st Cong., 1st sess. (Washington DC: USGPO, 23 June 1969); and Lawrence Freedman, *US Intelligence and the Soviet Strategic Threat* (London: Macmillan, 1977), pp. 153–9. It is not obvious, in retrospect, that the discounters were correct - if one assumes that SS-9 re-entry vehicles would have been targeted against *Minuteman* launch control centres.

[5] John Newhouse, *Cold Dawn: The Story of SALT* (New York: Holt, Rinehart and Winston, 1973), p. 9.

[6] For example, see George W. Rathjens: 'The Dynamics of the Arms Race', *Scientific American*, vol. 220, no. 4 (April 1969), pp. 15–25; and *The Future of the Strategic Arms Race: Options for the 1970s* (New York: Carnegie Endowment for International Peace, 1969).

[7] 'A Break-Through in Arms Control', *Bulletin of the Atomic Scientists*, vol. 26, no. 6 (June 1971), p. 5.

[8] It may be argued that the United States also proceeded with deployments which made sense primarily in terms of an active defence environment (i.e. *Minuteman* III and *Poseidon* C-3). This is correct, but it should be remembered that US MIRV deployment began in 1970, more than two years before the ratification of the ABM Treaty, and that by the late summer of 1972 the US already had 200 *Minuteman* III, and 160 *Poseidon* C-4, deployed. Moreover, US MIRV deployment may have played a significant role in persuading Soviet leaders that their extant BMD capability had little strategic promise.

[9] The SS-16, unlike the other three, has not been deployed, though it may have been stockpiled in modest numbers (say 100–200).

[10] See, for example, testimony by Dr Wolfgang Panofsky in *Strategic and Foreign Policy Implications of ABM Systems* (*op. cit.* in note 2), part 1, p. 332.

[11] For the official Department of Defence view of LOADS' relationship to MX, see William J. Perry, *The Department of Defense Statement on the MX System and Ballistic Missile Defense* before the Senate Committee on Armed Services, Subcommittee on Research and Development, US Congress, 96th Cong., 2nd sess. (Washington: Department of Defense, 12 March 1980).

[12] 'The Forgotten Dimensions of Strategy', *Foreign Affairs*, vol. 57, no. 5 (Summer 1979), pp. 982–3, 985.

[13] The LOADS radar is only one-fortieth the size of the radar required by the *Site Defense* BMD system. *Site Defense* is a direct technological extrapolation from *Safeguard*.

[14] The traffic-handling capability of the data-processing equipment to be used in LOADS also marks a dramatic improvement over *Safeguard* (even allowing for the greater size and sophistication of the threat).

[15] 'Fratricide' is the phenomenon whereby nuclear explosions create local conditions that damage or destroy oncoming warheads or cause them to deviate from their intented trajectories.

[16] See Richard Burt, 'Likelihood of SALT's Demise Changes the Strategic Options', *New York Times*, 23 March 1980, p. 4E.

[17] There is a consensus among official defence analysts that, for reasons of reliability, the USSR would choose to allocate two warheads to each MX shelter, regardless of their yield and accuracy. Some analysts outside government challenge this view on the grounds that most of the sources of ICBM failure are located in the early stages of the flight – so that the USSR could attack one-on-one, and then rapidly programme a reserve force of ICBM to fill the gaps created by those which failed in their boost or early mid-course phases.

[18] Long-wave infra-red optical sensing *should* work well, but it is not at present a demonstrated technology.

[19] For example, if both the 'overlay' and LOADS levels of BMD suffered a 20% warhead leakage rate, the overall system leakage would only be 4%.

[20] SSBN vulnerability is, in good part, a 'rate-of-find' problem. The SSBN fleets of the super-powers would not be invulnerable if an enemy was permitted weeks or months of crisis and wartime in which to find the boats.

[21] This fact is, of course, a distinct plus if one adheres to the notion that the defence of urban areas is destabilizing.

[22] A very useful discussion of this issue is Stanley Sienkiewicz, 'Observations on the Impact of Uncertainty in Strategic Analysis', *World Politics*, October 1979, pp. 90–110.

[23] See Colin S. Gray, 'Nuclear Strategy: The Case for a Theory of Victory', *International Security*, vol. 4, no. 1 (Summer 1979), pp. 54–87, and 'Targeting Problems for Central War', *Naval War College Review*, vol. XXXIII, no. 1 (January–February 1980), pp. 3–21, for detailed presentation of this argument and related issues.

[24] Ikle's question specified a time horizon. 'Can Nuclear Deterrence Last Out the Century?', *Foreign Affairs*, vol. 51, no. 2 (January 1973), pp. 267–85.

[25] 'The Case for Population Defense', in Holst and Schneider (*op. cit.* in note 2), p. 116.

ARTICLE THREE - "OPPORTUNITIES AND IMPERATIVES OF BALLISTIC MISSILE DEFENSE"

The author of the article, "Opportunities and Imperatives of Ballistic Missile Defense," is Senator Malcolm Wallop. He was elected to the US Congress from Wyoming in 1976 and wrote this article in 1979. In 1979, he was serving on the Select Committee on Intelligence and was Congressional Advisor to the Strategic Arms Limitation Talks (SALT) negotiations (14:13).

This article is representative of many articles in the 1977 through 1982 period. It represents other articles during this period because Mr. Wallop discusses rationale for an alternative to the traditional ground-based BMD. Coupled with this alternative is a potential major change in US military strategy. As an alternative to a limited BMD system, he recommends pursuing a space-based BMD that uses directed energy weapons, particularly lasers, to destroy an enemy's offensive weapons. The big advantage of this system is the potential to protect American lives and homes, not just strategic nuclear weapon systems. The article expresses that the main rationale for switching to developing and deploying a space-based BMD is that it will operate away from populations, thus avoiding destruction of people if it has to be employed. Strategy could change from one of assured destruction to one of "assured survival."

Senator Wallop sees that opportunities are within technological reach to start development of a space-based BMD. He believes this option for a BMD offers world stability and national security through the country's self-protection rather than reliance on destruction of the enemy. He also added that this new type of system would be less provocative. The atmosphere would be the superpowers' protection from accidental firings of the laser because the atmosphere dissipates the power of the laser. In 1979, Senator Wallop's concept was not widely accepted, but has become a major issue in BMD and national defense initiatives today.

Senator Wallop's article and suggestions for a space BMD serves as an excellent introduction to the most current debate on the rationale for a US BMD as well as the set of articles for the next chronological period in this anthology. His article is copied from the 1979 fall edition of Strategic Review and starts on the following page.

OPPORTUNITIES AND IMPERATIVES OF BALLISTIC MISSILE DEFENSE

MALCOLM WALLOP

THE AUTHOR: Senator Wallop (R.-Wyoming) was elected to Congress in 1976, and he serves on the Senate Finance Committee, the Energy and Natural Resources Committee, and the Select Committee on Intelligence. He is Assistant Minority Whip and a Congressional Adviser to the SALT negotiations. Senator Wallop served as a First Lieutenant in the U.S. Army Artillery.

IN BRIEF

The macabre delusion of "Mutual Assured Destruction" has blinded U.S. policymakers to the needs and means of defense in the ballistic missile age—to the point where in 1972 the United States forfeited a potent, if limited, ABM system. U.S. officials continue to cling to the MAD delusions in the face of overwhelming evidence that the Soviet Union never shared that delusion; indeed, Moscow is harnessing an ever more powerful strategic arsenal (including continued ABM development) to a rational war-fighting strategy. Especially in light of formidable opportunities inherent in new directed energy weapons, it is high time that we lay to rest the MAD phantom and bend our priorities and resources to the mission which, in the final analysis, the U.S. taxpayer expects of his armed forces: the protection of American lives and homes.

It is not the purpose of this article to argue that the armed forces of the United States should be capable of limiting damage to the United States in time of war. That proposition is self-evident—except perhaps to those who still cling with almost ideological obsession to one side of a long debate in professional "defense" circles. The purpose, rather, is to raise for public consideration the fact that technology is rendering the "balance of terror" obsolete. Technology now promises a considerable measure of safety from the threat of ballistic missiles. To be more precise, it offers that safety to whichever advanced nation is willing to grasp it.

Over the past fifteen years, at least four American presidents, and their leading defense advisers, have built weapons and cast strategic plans well nigh exclusively for the purpose of inflicting damage upon the enemy's society. Improvements in hardware and procedures have been judged by a single test: the ability to do harm to the Soviet Union. Not since the early 1960s has the military policy of the United States aimed at limiting the Soviet Union's ability to ravage the United States in a nuclear war.

American policy has been based on the assumption that any nuclear exchange would be so disastrous as to make it impossible to dis-

criminate between "better" and "worse" results of any such exchange. A study published in 1979 by the Congressional Office of Technology Assessment takes note of the fact that a Soviet nuclear strike against U.S. strategic weapons—a "disarming strike"—would kill less than one per cent of the American population. But the study appears to lump a tragedy of that dimension together with an across-the-board nuclear attack in which some 156 million Americans would die.

Because we have refused to acknowledge that the disaster of nuclear conflict could befall us, we have taken no measures to mitigate that potential disaster. The United States does not now have plans for its own defense in case of war with the Soviet Union. Last year this country spent over $120 billion for "defense." There seems to be little objection to the prospect of that sum rising substantially in future years. Yet, as one reads the latest of the nation's principal documents on defense, the Secretary of Defense's "Posture Statement," one cannot help but be confirmed in the conviction that those in charge of the nation's military forces have no clear idea of how these funds might be used to accomplish what in the final analysis the taxpayer expects of his armed forces—namely, to protect *American lives and homes.*

The MAD Hangover

Indeed, the fiscal year 1980 Posture Statement reflects deep ambivalence about the very possibility of defense. The fact of ambivalence must be counted as progress of sorts. Between roughly 1966 and 1979, the Department of Defense was in the iron grip of the doctrine of Mutual Assured Destruction, which considered any idea of damage-limitation—"defense" in the true sense of the word—as anathema to the security that was linked to a theoretical balance of offensive power between the United States and the Soviet Union. With overwhelming offensive power but no defense, neither side could deem military action rational.

The events of recent years, however, have given pause to all but the most zealous adherents of MAD—among whom, alas, President Carter has squarely placed himself with his State of the Union Address of 1979 and his speeches on behalf of the SALT II Treaty. In the 1970s the Soviet Union has built missiles unambiguously capable of a rational military act—that of largely disarming the United States without necessarily targeting population centers. Moreover, the Soviet Union is working on antiballistic missile defenses more intensively than the U.S. Central Intelligence Agency seems willing to acknowledge.

Aware of what the Soviets are doing but still deferential to MAD, the authors of the FY 1980 Posture Statement wrote it like a Hamletian soliloquy. The document recognizes, on the one hand, the utility of being able to destroy the opponent's missiles, even as the Soviet Union is developing the capability to destroy U.S. land-based missiles, and envies the other side's ability to shelter millions of its people. On the other hand, the Posture Statement refuses to recommend to the Congress that the United States do all it can now to build warheads capable of destroying hardened Soviet weapons. The document proceeds as if active strategic defenses were out of the question, and scoffs at civil defense. It then concludes by admitting that "we" do not have a very good idea of the conflict we are trying to deter.

At the source of this confusion is what can best be described as the "MAD hangover." The affliction is powerful enough, given its long and stubborn history. Within months of the first nuclear explosion in 1945, American news media propagated a simple message, which appealed to the messianic streak in the American ethos: Because nuclear war "would be the end of mankind," "the Bomb" should end major war forever. The strategic analyst Bernard Brodie emerged as the first apostle of MAD. In 1946, while the United States held an absolute monopoly of nuclear power, Brodie postulated in his book, *The Absolute Weapon*, that the best hope for mankind lay in a peculiar kind of nuclear equality between the United States and the USSR. Both the United States and the Soviet Union, averred Brodie, should possess forces capable of devastating the other's society; the corollary was that each would be utterly incapable of defending its own society.

It took over twenty years for the vision adumbrated by Brodie to assume a certain enticing pseudo-reality—and it took another ten years for the vision to be dissipated. In the early postwar period, when bombers represented the main strategic weapons, superior American aircraft would have been able to penetrate So-

viet defenses almost at will, while Soviet bomber fleets would have foundered against superior American air defenses. The United States sustained its unquestioned strategic nuclear superiority through the first phase of the missile age, so that as late as the mid-1960s the United States could have aimed, even with its then inaccurate missiles, a disarming strike at Soviet missiles deployed on "soft" launch pads, while retaining most of its force in reserve.

By the latter part of that decade, however, the Soviet Union followed the United States in deploying ballistic missiles either in hardened silos or aboard submarines. By 1969, the USSR commanded as many missiles as did the United States. Because neither American nor Soviet missiles were at once powerful and accurate enough to knock out opposing missile silos, U.S. policymakers leaped to the conclusion that the age of stable strategic deterrence of Brodie's vision had come to pass.

The most convinced devotees of this view were the then Secretary of Defense of the United States, Robert McNamara, and his principal aides, including the present Secretary of Defense, Harold Brown. Their statements at the time, upon which they based their force decisions for the 1970s and 1980s, make embarrassing reading today. In an interview in the *U.S. News and World Report* in April 1965, Mr. McNamara declared that the Soviets "have decided that they have lost the quantitative race and they are not seeking to engage us in that contest." And he elaborated in a speech to U.P.I. in San Francisco in September 1967: "Is the Soviet Union seriously attempting to acquire a first strike capability against the United States? . . . We believe the answer is no."

Today, a mere dozen years later, the answer to McNamara's question is resoundingly "yes." There is broad agreement in the U.S. strategic community that a small portion of the Soviet missile force is capable of destroying nearly all American land-based missiles in their silos, thereby blunting the United States' capability to inflict retaliatory destruction upon Soviet society. In retrospect, American officials made the mistake of supposing (as both desirable and permanent—because they wished it so) a strategic situation that had materialized as the fortuitous but transitory convergence of one side's desires, the other side's efforts and the state of the technology in a given period.

The question that pervades the gathering American strategic debate is: "What now?" Some of the tentative answers that have been circulating are hardly invigorating. Driven by the force of habitual thinking, they seem to revolve around schemes by which the United States might somehow resuscitate an "assured destruction" capability in its offensive strategic force. Yet, even if the United States were somehow able to muster a full-fledged capability against Soviet missile silos, the inherent stability and wisdom of any new strategic equation based strictly on offensive forces would remain very much in doubt. It is high time that we lay the phantom of MAD to rest and that we turn our attention to the realistic task of affording maximal protection for our society in the event of conflict. The Soviet Union, for its part, has never really deviated in its attention to this task.

The Old Anti-ABM Arguments

The anti-ballistic missile (ABM) systems banned by the SALT I Treaty of 1972 relied on large, phased-array radars to pick up incoming warheads as soon as they appeared high in space above the curvature of the earth. Computers associated with these radars would then sort through the information, discriminate among real warheads, chaff and decoys, and "hand over" targets to smaller radars. In the American Safeguard ABM system (of which only a single site was built) a medium-sized missile, "Spartan," would intercept warheads about twenty miles away, whereupon a smaller, bullet-like conical missile, "Sprint," would be assigned to the incoming missiles which "leaked" through the initial defense. In 1972, the Soviet Union had no system comparable to the Sprint. Moreover, its phased-array radars seemed primitive, and its computers could not sort through data as rapidly as could those of the United States.

The ABM which the United States negotiated away in SALT I was a potent but obviously limited system. The Spartan and Sprint missiles were reliable enough, but two technical objections to the ABM stood out. First, it was argued that while the combination of radars and computers could sort through only a very few thousand radar contacts at a time, the Soviet Union could be expected to try to overwhelm the system by putting several times that number of warheads and penetration aids simultaneously

into any attack. Opponents of the ABM conceded that if Safeguard were deployed nationwide, the Soviet Union would not have enough warheads to overwhelm the system across-the-board, but in only one or two areas. But their second and corollary argument held that the Soviets would inexorably acquire the necessary number of warheads and penetration aids to overwhelm the entire ABM system because, it was contended, the cost to the defense of shooting down any one warhead was greater than was the cost of that warhead to the offense.

Such arguments, however, never took into account the value of the target defended. Nor did they consider the possibility that, as the offensive forces of the Soviet Union improved, American defenses might improve even more rapidly. The logic of MAD effectively barred such notions.

A third argument against Safeguard—a nontechnical one—was psychologically more powerful. Although the Safeguard ABM could knock down a high percentage of incoming warheads —no one could know precisely how high— some warheads would be certain to penetrate the defenses. Doctrinaire (and demagogic) adherents of MAD argued that the nation would be "destroyed" as *effectively by 100 nuclear* warheads as by 10,000, and that, consequently, any defensive system that fell short of assured perfection would actually do more harm than good—by emboldening the United States to take risks of nuclear conflict which it would not otherwise entertain in face of its vulnerability. They argued that the United States ought not to give up the hope of total avoidance of nuclear war for the sake of a system which could offer good, but not total, protection.

Improvements in Conventional BMD

The Soviet Union's approach to anti-ballistic missile defense has been radically different. In contrast with the U.S. experience, defense against ballistic missiles is wholly consistent with the Soviet military doctrine. The Soviet Union has been endeavoring to develop an ABM ever since the very beginning of the missile age.

Until 1968, the Soviets refused peremptorily all offers to negotiate limits on ABMs. A statement made by Premier Kosygin at a London news conference on February 9, 1967, still makes fascinating reading today. Not only did Kosygin reveal the Soviet leaders' basic attitude toward ABM, but he also derided the specific American "cost effectiveness" approach that looked at ABM primarily in terms of its cost relationships to offensive weapons. To a question whether the Soviet Union would consider a moratorium on the development of an ABM, Kosygin replied in part as follows:

> Which weapons should be regarded as a tension factor—offensive or defensive weapons? I think that a defensive system, which prevents attack, is not a cause of the arms race but represents a factor preventing the death of people. Some persons reason thus: Which is cheaper, to have offensive weapons that can destroy cities and entire states or to have defensive weapons that can prevent this destruction? At present the theory is current in some places that one should develop whichever system is cheaper. Such "theoreticians" argue also about how much it costs to kill a person, $500,000 or $100,000. An antimissile system may cost more than an offensive one, but it is intended not for killing people but for saving human lives.

One year later, however, the United States tested what later became the Safeguard system. After those successful American tests, a treaty banning ABMs became the Soviets' first priority.

Since 1972 both superpowers have continued research into conventional ABMs. In terms of technology alone, a substantial distance has been covered. No longer must incoming warheads first be seen by huge ground-based radars, which must then sort the "wheat from the chaff." Now there is the possibility of sending detectors into space, which would spot the missiles themselves before they could have released their penetration aids, and which would direct long-range interceptors to the warheads while they were still in mid-course. Shorter-range interceptors could then still pick off those warheads that had eluded mid-course interception. There would thus be fewer "leaks." Moreover, the cost of destroying an offensive warhead in this fashion would be somewhat less than the cost of the warhead to the offense.

There have also been some ingenious low-technology inventions. The best known, "Porcupine," is a mortar filled with a high explosive which shoots thousands of steel darts into the path of incoming warheads, either destroying them or exploding them too high for accom-

plishing their intended damage. "Porcupine" is best fit for defending ICBM silos.

One should emphasize that these are but technological possibilities. Since 1972 the United States has not actually constructed any defensive weaponry. It has even torn down the one ABM site which it was permitted under SALT I and dismantled all but one site for missiles designed to defend against aircraft.

By contrast, since SALT I the Soviet Union not only has sustained its allotted ABM site, which defends Moscow, but it has constructed the foundation for a nationwide ABM system. Four huge phased-array radars have been erected in the Soviet Union. The Soviets have continued ABM research, which has brought them, it would seem, to a level of technology comparable to that which the United States achieved by about 1970. In order to install a nationwide ABM defense of the Safeguard type, Moscow now needs only to mass-produce the missiles and the small radars involved.

Such a powerful, though limited, ABM capability looms as more significant in Soviet than in American hands, given the constrasting strategic postures and strategic doctrines. If the Soviets, following the path inherent in their strategic deployments, were to aim a disarming strike at the vulnerable land-based U.S. Minuteman force, they could then concentrate their ABMs against the residual American force of submarine-launched missiles. If by the late 1980s the United States were to go ahead with the production and deployment of modernized MX land-based missiles, Soviet ABMs could provide a respectable point defense of Soviet weapons against the MX.

It needs to be emphasized that, in contemplating the deployment of such a "conventional" ABM system within the present state of the art, the Soviets are not likely to be inhibited by the MAD inspired standards of perfection that have blinded the United States. Despite its limitations, such a Soviet system would present United States strategy with potentially great difficulties. It would constitute not a "revolution" in strategic weaponry, but simply the judicious use of established technology.

II. Emerging Directed Energy Arsenal

Much has been written lately about the potential of directed energy weapons. Much more discussion is needed both within the United States government and the public forums, given the enormous potential of these weapons for defense against long-range ballistic missiles.

The clear fact is that there are no legal barriers to the adoption of these weapons by either superpower. The SALT I Treaty of 1972, which banned "conventional" ABMs, specifically mentioned ABM systems "based on other physical principles," committing the United States and the Soviet Union only to discussing such systems if and when they "are created."

There are two distinct kinds of directed energy weapons: lasers and particle beams. The two work on wholly different principles, have substantially different effects and promise results which have little in common.

The discussion of the general subject has been distorted by controversy over whether "particle beam" weapons are at all feasible, as well as by dispute over the performance of laser weapons in anti-aircraft defenses, compared to that of other weapons for the same work. These distortions are cleared away once we focus on the central fact that the primary, the most immediate, task is to stop ballistic missiles, once launched, from hitting their targets in the United States. We should be interested in lasers for ballistic missile defense because we know of their potential in this role, irrespective of their utility in other military tasks. We should be less interested in possible particle beam weapons because it is far from clear that they could ever figure conclusively in ballistic missile defense.

In order to offer radical improvement over the performance of conventional ABM interceptors, directed energy weapons would have to be based in space, whence they could attack enemy missiles soon after they are launched. By so doing, they could attack the missile's booster, which is by far slower, more detectable and softer than are the warheads which it later deploys. Destroying the booster negates the aggressor's investment in multiple warheads and penetration aids. If directed energy weapons were deployed on the ground, one would need almost as many of them as there are targets to be defended. Stationed in space, however, where there is no atmosphere to hinder the beams and each of these weapons may project its energy for thousands of miles, only a few dozen of these weapons could conceivably destroy a whole fleet of ballistic missiles.

Particle beam weapons are peculiarly ill-suited to deployment in space, since they are streams of subatomic particles or ionized small molecules which have been accelerated by means similar to the cyclotrons used in nuclear research. They need enormous electric power—at least 6 times 10^{10} joules over a full second. That means that they require a power plant so huge as to make deployment in space impractical. Even if such a weapon could be deployed in space, its beam would be bent by the earth's magnetic field to the extent it possessed any electrical charge. This would negate accurate firing.

Constructing a neutral beam would be difficult. Even if one were made, it would be difficult to keep it from spreading too thinly over thousands of miles. However, particle beam weapons based on the ground, as terminal defenses, could be modestly useful. The atmosphere hinders the beam, but it also keeps it compact, because the beam, or rather each pulse, literally burns a tunnel through the air to make way for successive pulses. Since the beam must be stationary in order for subsequent pulses to take advantage of the previous pulses' work, the weapon simply cannot follow a moving target and "zap" it at the speed of light. The effective speed of a particle beam which must bore its way through the atmosphere is little different from that of interceptor missiles. It is possible nevertheless that, despite their limitations, particle beam weapons could join the Soviet weapons inventory in the mid-1980s. They would be point defense weapons, and as such they would impact modestly on the strategic equation.

The Potential of Laser Weapons

In the atmosphere, lasers could be as effective as particle beams. But there is no reason to deploy lasers as point defenses on earth, because laser beams may be generated more efficiently in space, where they also propagate without difficulty. Several dozen laser weapons systems deployed in space would revolutionize the strategic equation as we have known it for nearly two decades—above all by decisively tipping the balance of modern warfare in favor of the defense and radically mitigating the potential destructive effects of war.

Lasing action occurs when certain molecules are supersaturated with energy and then undergo an abrupt loss of energy. Part of the energy lost is given off as light and is reflected back and forth through these molecules so as to stimulate further production of light. Then, coherent light is drawn off through one mirror which is partially reflecting. Subsequently, larger mirrors focus that coherent light into a very narrow beam.

There are several ways of generating high-energy lasers. In the United States the high levels of laser energy have been achieved by the rather simple process of burning chemical fuel (chiefly hydrogen and fluorine) in order to excite the molecules directly. This has produced powerful, continuous waves (CW) of infrared (IR) light. Much progress has also been made in exciting molecules of inert gases (xenon and krypton) by electricity or by nuclear radiation. These "excimer" lasers produce ultraviolet (UV) light.

Lasers kill their target by placing thermal energy (flux) upon them. Ultraviolet light delivers this energy three or four times more efficiently than does infrared, because it is absorbed that much more easily. Therefore, ultraviolet lasers would be preferable as weapons. However, the less efficient infrared lasers are much closer to being ready for use in space because they require relatively little heavy equipment. Indeed, the main requirement for these chemical lasers is that the products of the chemical reaction be diffused very quickly into an area of very low pressure. The environment of space fills this requirement perfectly without expenditure of energy.

These lasers are, in concept, capable of power that is quite adequate for defending against ballistic missiles. One of the most heartening developments for the United States in recent years was the discovery that much less laser energy may be needed for defense against ballistic missiles than had been believed previously. This discovery flows from some realistic experiments of the effect of lasers on containers similar to the boosters of ballistic missiles. The containers "hit" by the lasers in these tests had been placed under physical and thermal stresses approximating those which would be acting on a ballistic missile soon after it is launched and just after it leaves the earth's atmosphere. The amount of infrared laser flux needed to destroy these containers is the equivalent of several

common household lightbulbs per square centimeter of the target.

The components of space satellites now used by the Soviet Union and the United States for warning, intelligence and communications are even more sensitive to lasers than are missile boosters. Most of our satellites on low orbit are so vulnerable that existing lasers, even if based on the ground, could destroy or disable them by using far less than their full power. Useful as they may be for anti-satellite operation, however, the real pay-off for lasers lies in space-based defense against ballistic missiles.

The elements of such a defense are well known. Beside the laser itself, a large main mirror is needed to focus the beam over a long distance. The larger the mirror is, the longer the distance becomes. The quantity of laser energy which destroyed missile-like targets in the above-mentioned tests could be projected *three thousand miles* away by a laser smaller than one megawatt using a mirror ten meters wide, or by a five megawatt laser using a four-meter mirror. Laser mirrors of such sizes are certainly within reach of existing technology in the United States, the Soviet Union, Western Europe and Japan. Indeed, several ways of fashioning such mirrors have been developed.

The other principal element in the laser's anti-ballistic missile mode is an accurate mechanism to point at a target some three to four thousand miles away, to keep the laser on target for the second or so required for the kill, and to retarget the laser very rapidly. The development of such a device is strictly a problem of engineering. The several facets of the device's technology have existed for some years in the infrared satellites used for early warning of launches of ballistic missiles, in the photographic intelligence satellites and in the space telescope. As *Aviation Week & Space Technology* has reported, the improvement and integration of these techniques is underway in the United States, but they are being conducted without any ostensible urgency.

In addition, a laser-based ABM system would require sensors to pick up evidence that one or more missiles had been fired, and equipment for computation and communication which would assign each target to the battle station in the best position to engage it. This entails equipment which is undeniably complex, but represents essentially an outgrowth of early warning systems which have been serving us in space for some time.

Laser Deployments

If the United States were to take the decision to provide itself with active defense, the first space-based battle stations incorporating the above-mentioned elements could be in orbit by the mid-1980s. According to current projections, each battle station would orbit the earth at an altitude of roughly 800 miles. With an effective range of some 3,000 miles, each station could cover about 10 per cent of the earth's surface or about 20 million square miles.

If such a laser station could be established in space above the Soviet Union, it could intercept any ballistic missile launched from Soviet territory. But in order for any satellite to hover over a terrestrial location (geosynchronous orbit), it must travel at twenty thousand miles above the earth. Lasers powerful enough to project energy sufficient to kill a missile over such distances are not yet within the grasp of technology. Even if such a long-range laser weapon could be perfected, a minimum of eight geosynchronous laser battle stations would be needed to cover not only the Soviet Union, but also the oceans whence Soviet SLBMs could be fired at the United States.

In any event, projections for the foreseeable future indicate lasers with effective ranges of only three thousand miles, which would have to be moving in their orbits over the face of the planet. Some two dozen such stations would have to be orbiting in order to cover every spot on the globe at any given time. Each station would have enough fuel for about a thousand "shots" --meaning that each could cope with the theoretical contingency of a thousand missiles launched beneath it in almost simultaneous barrage. Each battle station might have to be equipped with more than one laser in order to ensure an adequate rate of fire.

Any nation which deployed two dozen of these first-generation chemical laser stations would command the portals of space against the rockets of any other nation. The strategic implications are obvious. But the strategic balance could be jolted by fewer than two dozen stations. As few as ten would suffice to fend against a small scale attack, such as one by 300 Soviet SS-18s against American land-based missiles, or a retaliatory strike against the Soviet

Union by a residual American missile force that had survived a Soviet counterforce attack.

The time between deployment of the first operational battle station and the achievement of a full-fledged defense could be remarkably short. Even the construction of two dozen battle stations augurs as a relatively modest effort for the American aerospace industry. If an all-out effort on the scale of the Manhattan Project were mounted, a full-fledged defense could materialize well before the close of the 1980s.

Implications for Strategy and Arms Control

Of course, countermeasures may be developed against lasers, as against any weapon. But at least in the foreseeable future, any conceivable countermeasures would in themselves detract from the potency of the offense. Thus, missiles might be rendered more resistant to laser flux by being coated with several centimeters of cork or kevlar armor. But all coating materials add weight, which could only be accommodated through commensurate subtractions from the missile's payload. In order roughly to double a missile's resistance to laser flux, the missile's ability to inflict damage on its target would have to be cut just about in half.

Even the coating of missiles against laser flux, however, would be no insurance against likely laser improvements. Thus, a shift from infrared to ultraviolet lasers would increase their efficiency three to fourfold. The promise of space-based laser weapons is that they would operate in a strictly military environment divorced from innocent populations. They could not kill people (outside of some luckless astronaut) or destroy cities. Were the weapons to be focused accidentally on a sun-bather on a beach, he might have to turn over a bit more often than usual to avoid sunburn, but the atmosphere would protect him from ill effects. The laser does not loom as a weapon of mass destruction: it threatens nothing except weapons of mass destruction. In no rational sense could anyone consider it "provocative." If the system made a mistake in peacetime, the worst it could probably do is abort the Soviet Union's attempt to launch a weather satellite.

Laser battle stations would be difficult to attack. They could destroy conventional interceptors and turn their mirrors against attacks by laser beams. Nevertheless, they probably will not be invulnerable. Like all other weapons in history, they would be neither "absolute" nor "ultimate." Technology no doubt will eventually find a chink in the armor, as it has always done in the past. But this prospect hardly justifies a deliberate decision to forgo a step in the evolution of warfare and/or its prevention — especially a step that bears the label of "defense" more incontrovertibly than any other weapons system of modern vintage.

There seems to be a conspicuous reticence in much of the United States' scientific and technical community about putting together the several elements of a space-based laser system for the purpose of defense against ballistic missiles. The reason proceeds from a pervasive assumption that the present U.S. Administration and its Congressional allies, committed as they are to the doctrine of Mutual Assured Destruction, would move to stifle the work now in progress on several elements of a potential system as soon as a BMD label on the system became explicit.

Officials in industry and in the Executive and Legislative branches of the government who bear responsibility for development of these elements have sought to push their efforts as far as possible without drawing the attention of an Administration that has demonstrated its hostility to active defenses. Such integration of the elements as is being undertaken is occurring under the rubric of anti-satellite warfare. The system under development, once integrated, could indeed incapacitate enemy satellites and protect American ones. Yet the very same anti-satellite system now being envisaged in the Defense Department could knock out ICBM boosters as readily as it could knock out satellites. Indeed, the Administration has shown a great deal less than enthusiasm for this anti-satellite system precisely because of its BMD implications.

It boggles reason that anyone charged by the Constitution with responsibility for the defense of the United States could be addicted to a pseudo-doctrine to the extent of refusing to authorize the means by which his nation might minimize the catastrophe of war. It is both astounding and depressing to listen to the urging of officials that money not be "wasted" on defensive systems which might be less than perfect, but could save millions of lives.

Space-based laser systems will not spell the

a terminal underlay. The advanced components, though developed initially in an ATM mode, might later play a role in continental United States (CONUS) defense. Such an option addresses the pressing military need to protect allied forces as well as our own, in theaters of operations, from either nonnuclear or nuclear attack. It would directly benefit our allies as well as ourselves. Inclusion of such an option in our long-range R&D program on ballistic missile defenses should reduce allied anxieties that our increased emphasis on defenses might indicate a weakening in our commitment to the defense of Europe. We can pursue such a program option *within ABM Treaty constraints*. Such a course is therefore consistent with a policy of deferring decisions on modifying or withdrawing from the treaty.

- *Intermediate CONUS Options*

  Intermediate capabilities may also have important applications in CONUS, initially to defend critical installations such as C^3I nodes. As the defense system is thickened, it also will add to Soviet uncertainties in targeting, even in large-scale attacks, thereby enhancing deterrence. Depending on rates of progress in the R&D program, a two-phase defense of high effectiveness against moderate threats might comprise both endoatmospheric and exoatmospheric components employing space-based sensors and ground-based interceptors. These intermediate components would be the lower tiers in a full multilayered system.

- *Limited Boost-Phase Intercept Options*

  Some intermediate options may provide useful near-term leverage on Soviet plans and programs even if they prove unable to meet fully sophisticated Soviet responses. An early boost-phase intercept system with capability against large rockets similar to those that are an important part of Soviet forces may be one example. Such an option could impose costs on the Soviets and increase their incentive to move toward an offensive posture that is more stable and less threatening. A definitive assessment of the utility of such options must specify their technological and political feasibility, timing, and cost, and the ease with which they can be countered.

6. Pursuit of the President's goal, especially if it is interpreted solely in terms of the full, nearly leakproof system, will raise questions about our readiness to defend against other threats, notably that of air attack by possible advanced bombers and cruise missiles. An appropriate response to such questions will require an early and comprehensive review of air defense technologies, leading to the development of useful systems concepts.

Defensive Systems and Stability of Deterrence

7. Deployment of defensive systems can increase stability, but to attain this goal we must design our offensive and defensive forces properly; especially, we must not allow them to be vulnerable. In combination with other measures, defenses can contribute to reducing the prelaunch vulnerability of our offensive forces. To increase stability, defenses must themselves avoid high vulnerability, must be robust in the face of enemy technical or tactical countermeasures, and must compete favorably in cost with expansion of the Soviet offensive force.

The Preferred Path to the President's Goal: Intermediate Options

2. *The new technologies offer the possibility of a multilayered defense system able to intercept offensive missiles in each phase of their trajectories.* In the long term, such systems might provide a nearly leakproof defense against large ballistic missile attacks. However, their components vary substantially in technical risk, development lead time, and cost, and in the policy issues they raise. Consequently, partial systems, or systems with more modest technical goals, may be feasible earlier than the full system.

3. *Such "intermediate" systems may offer useful capabilities.* The assessment in this study of the utility of intermediate systems is necessarily tentative, owing to the current lack of specificity in systems design, effectiveness and costs. Nevertheless, it indicates that, given a reasonable degree of success in our R&D efforts, intermediate systems can strengthen deterrence. They will greatly complicate Soviet attack plans and reduce Soviet confidence in a successful outcome at various levels of conflict and attack sizes, both nuclear *and nonnuclear.* Even U.S. defenses of limited capability can deny Soviet planners confidence in their ability to destroy a sufficient set of military targets to satisfy enemy attack objectives, thereby strengthening deterrence. Intermediate defenses can also reduce damage if conflict occurs. The combined effects of these intermediate capabilities could help to reassure our allies about the credibility of our guarantees.

4. *A flexible research and development (R&D) program designed to offer early options for the deployment of intermediate systems, while proceeding toward the President's ultimate goal, is preferable to one that defers the availability of components having a shorter development lead time* in order to optimize the allocation of R&D resources for development of the "full system."

- Intermediate defense systems can help to ameliorate our security problems in the interim while full systems are being developed.

- The full-system approach involves higher technical risk and higher cost. On the other hand, an approach explicitly addressing the utility of intermediate systems offers a hedge against the possibility that nearly leakproof defenses may take a very long time, or may prove to be unattainable in a practical sense against a Soviet effort to counter the defense.

- The deployment of intermediate systems would also provide operational experience with some components of later, more comprehensive, and more advanced defense systems, increasing the effectiveness of the development effort.

5. We have considered several possible intermediate options:

- *Anti-Tactical Missile (ATM) Options*

  Deployment of an anti-tactical missile (ATM) system is an intermediate option that might be available relatively early. The system might combine some advanced midcourse and terminal components identified by the Defensive Technologies Study with

SUMMARY REPORT

A. MAJOR CONCLUSIONS AND RECOMMENDATIONS

The Strategic Need for Defensive Systems

1. *U.S. national security requires vigorous development of technical opportunities for advanced ballistic missile defense systems.*

- Effective U.S. defensive systems can play an essential role in reducing reliance on threats of massive destruction that are increasingly hollow and morally unacceptable. A strategy that places increased reliance on defensive systems can offer a new basis for managing our long-term relationship with the Soviet Union. It can open new opportunities for pursuing a prudent defense of Western security through both unilateral measures and agreements. The Soviets have often used arms negotiations to pursue competitive military advantage. The Soviet Union is likely to cooperate in pursuing agreements that are mutually beneficial *only* if it concludes that it cannot accomplish its present political goals because it faces Western firmness and ability to resist coercion.

- Technologies for ballistic missile defenses, together with those for precise, effective, and discriminate nuclear and nonnuclear offensive systems, are advancing rapidly. They can present opportunities for resisting aggression and deterring conflict that are safer and more humane than exclusive reliance on the threat of nuclear retaliation.

- A satisfactory deterrent requires a combination of more discriminating and effective offensive systems to respond to enemy attacks plus defensive systems to deny the achievement of enemy attack objectives. Such a deterrent can counter the erosion of confidence in our alliance guarantees caused by the adverse shifts in the military balance since the 1960s.

- Readiness to deploy advanced ballistic missile defense systems is a necessary part of a U.S. hedge against the increasingly ominous possibility of one-sided Soviet deployment of such systems. Such a Soviet deployment, superimposed on the present nuclear balance, would have disastrous consequences for U.S. and allied security. Clearly this possibility, especially in the near term, also requires precautionary measures to enhance the ability of our offensive forces to penetrate defenses.

CONTENTS

Preface

President Reagan has directed an "effort to define a long-term research and development program...to achieve our ultimate goal of eliminating the threat posed by strategic nuclear missiles...." The President noted that the achievement of the ultimate goal was a "formidable technical task" that would probably take decades, and that "as we proceed we must remain constant in preserving the nuclear deterrent...maintaining a solid capability for flexible response...pursue real reductions in nuclear arms...(and) reduce the risk of a conventional military conflict escalating to nuclear war by improving our nonnuclear capabilities."

Two studies assisted in that effort: (1) the Defensive Technologies Study (DTS) to review the technologies relevant to defenses against ballistic missiles and recommend a specific set of long-term programs to make the necessary technological advances, and (2) the Future Security Strategy Study (FSSS) to assess the role of defensive systems in our future security strategy. The implications for defense policy, strategy, and arms control were addressed by two FSSS teams: an interagency team led by Mr. Franklin C. Miller, and a team of outside experts led by Mr. Fred S. Hoffman. This is a report on the results of the work of the team of outside experts. The work was done under the auspices of the Institute for Defense Analyses at the request of the Office of the Under Secretary of Defense for Policy to assist the interagency team.

This report and its conclusions do not necessarily represent the views of the Department of Defense or the Institute for Defense Analyses.

Acknowledgments

This report is a summary of work performed by a Study Team whose members were: Mr. Fred S. Hoffman, Director; Mr. Leon Sloss, Deputy Director; Mr. Fritz Ermarth; Mr. Craig Hartsell; Mr. Frank Hoeber; Dr. Marvin King; Mr. Paul Kozemchak; Lt. Gen. C. J. LeVan, USA (Ret.); Dr. James J. Martin; Mr. Marc Millot; Mr. Lawrence O'Neill; and Dr. Harry Sauerwein. The work of the Study Team has been reviewed by a Senior Policy Review Group consisting of Professor John Deutch; Dr. Charles Herzfeld; Mr. Andrew W. Marshall; Dr. Michael May; Professor Henry S. Rowen; General John Vogt, USAF (Ret.); Ambassador Seymour Weiss; Mr. Albert Wohlstetter; and Mr. James Woolsey. Supporting papers have been contributed by Mr. Craig Hartsell, Dr. James J. Martin, Mr. John Baker, Lt. Gen. C. J. LeVan, Mr. Douglas Hart, Mr. Marc Millot, Dr. David S. Yost, Mr. Leon Sloss, and Mr. Frank Hoeber.

The Study also benefitted from comments and suggestions by Dr. Thomas Brown, Dr. Ashton Carter, and Dr. Thomas Rona.

The Panel also has had the invaluable cooperation of Lt. Col. Irving Schuetze, USA.

Responsibility for the views expressed herein rests with the Study Team..

BALLISTIC MISSILE DEFENSES AND U.S. NATIONAL SECURITY

SUMMARY REPORT

Fred S. Hoffman, *Study Director*

October 1983

Prepared for the

FUTURE SECURITY STRATEGY STUDY

Reagan's goal to eliminate the threat of nuclear attack. The specific recommendation is to consider deployment of an intermediate system that can provide limited defense capabilities while working toward a full system. This initial step would serve as a defensive umbrella to build a full system. The intermediate system would later be incorporated into the full defense system as technologies were developed. This concept is referred to as a transition period in several other articles written during this period.

The Hoffman report is cited by proponents of a US BMD in current literature because its conclusions support that work started on a BMD will benefit the US. The report follows on the next page.

ARTICLE ONE - "BALLISTIC MISSILE DEFENSES AND U.S. NATIONAL SECURITY SUMMARY REPORT"

This report, dated October 1983, is a summary of work accomplished by a study team for the Future Security Strategy Study (FSSS). The FSSS was organized to assess the role of defensive systems in future security strategy. The Office of the Under Secretary of Defense for Policy requested the report. The director of the study was Mr. Fred S. Hoffman who is the director of the "think tank" named Pan Heuristics. The remaining 11 members of the team are listed in the report. Also notable is the participation of a distinguished Senior Policy Review Group, also listed in the report (16:iii-iv).

The Study Team stated several conclusions and recommendations. Some of them are applicable for this anthology on the rationale for a BMD for the US. First, a key point for a BMD is the potential for the US and USSR to move away from the strategy of massive destruction and toward a safer strategy for the world. The strategy for reliance on defensive systems leads to a morally acceptable strategy or position for maintaining US defenses. Another reason for pursuing a BMD is to cease the downward spiral of confidence by US allies that the US will guarantee deterrence. The shift of military power in the last decades in favor of the Soviets may result in the Soviets risking military action in Europe. A US BMD will help restore the deterrent strength if the Soviets are uncertain of US retaliatory capability. Third, a BMD system may be a rational approach to counter additional Soviet deployments of nuclear weapons. For example, if the US attempts to counter the Soviet's military buildup with additional offensive forces, the Soviets have demonstrated in the past that they will continue to build massive forces. Deploying a BMD is an alternative that may create uncertainty of a successful Soviet attack and restore the balance of power between the nations. A fourth reason for developing and being ready to deploy a BMD is as a hedge against the threat of a widespread deployment of the Soviet's ABM system. The offensive nuclear threat posed by the Soviets is emphasized in this article, and normally any article providing rationale for a US BMD, but this report includes an increasing threat by the Soviets to deploy a widespread ABM defense. The repercussion of such a Soviet action without a timely US response will threaten the success of US retaliatory forces. Thus, the security of the US and its allies will be jeopardized. The final argument gleaned from the report is that a BMD may increase the probability of negotiating significant arms control agreements with the Soviets.

The report states or defends a recommendation to take intermediate actions on the road to fulfilling President

Many of the articles recount rationale for a US BMD from previous years, but the articles for this period are distinctive because the authors emphasize the move from mutual destruction to deterrence through self-protection. This anthology includes articles from 1983 through September 1984, but the debate still rages on with constant scrutiny and criticisms by opponents and rebuttals by proponents.

Chapter Four

SELECTED ARTICLES: 1983-1984

INTRODUCTION

The most recent period of articles on the rationale for a US BMD starts in 1983. President Reagan's "Star Wars" speech on March 23, 1983, launched a new phase in BMD history. His support for researching and developing the capability to defend the US from an enemy nuclear attack initiated a new wave of arguments for and against a US BMD system (12:25; 13:145).

President Reagan's suggestion to move away from a retaliatory strategy to a strategy of protection by basing a BMD in space are not new. At least as early as President Kennedy's Administration, there has been disfavor with assured destruction as our national military strategy against the Chinese and Soviet nuclear threat (2:120). In addition, the concept of using directed-energy weapons in space for a BMD was often recommended prior to Reagan's announcement (see Chapter Three, Selected Article Three). But since the late 1960s, technology to implement a space-based defense has grown to make it more feasible to deploy a comprehensive defense (13:38-39). President Reagan tried to seize the opportunity and has taken the concept from paper and initiated the challenge to try to accomplish the monumental task. His actions have ignited a barrage of articles by critics and supporters.

Three important developments in US domestic and international affairs should be recognized before analyzing the articles in this period. The first is Reagan's stated promise and commitment to reestablish the US military capability from the 1970s. He has backed that up with increased military spending for improving and obtaining offensive and defensive weapon systems (22:67,193). Second, the US and Soviets have failed to negotiate an arms control agreement for offensive nuclear weapons. Finally, the US and its allies have become more dependent on each other for their national security than in the past (20:15). Each factor has influenced articles on BMD in this time period.

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12. "Laxalt/Garn Ask for Discard of MX MPS Plan - Call for MX in Minuteman Fields With ABM." Defense Daily, (29 June 1981), p. 321.

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end of war, but they at least hold the promise of barring nuclear-tipped ballistic missiles of mass destruction from the arena of war. To be sure, the superpower that grasps that promise first will wrest an enormous strategic advantage. But especially in light of the Soviet Union's emerging offensive superiority vis-a-vis the United States, what responsible American official could counsel rationally that the United States deliberately forfeit the opportunity of effective defense? And, for that matter, what sincere advocate of arms control could not bring himself to admit that "Assured Protection" would be preferable to "Assured Destruction"?

8. As currently assessed, some boost-phase intercept systems and other space-based components pose serious policy problems, because of engagement time constraints. Space-based components may also be highly vulnerable to Soviet boost-phase intercept systems, or anti-satellite (ASAT) systems. It will be imperative to design systems which are not themselves subject to rapid attack. Alternative approaches need to be developed in the R&D program that permit safe arrangements for the operation of the defensive system.

Soviet Policies, Initiative, and Responses

9. *The common assumption that the decision to initiate widespread deployment of ballistic missile defense systems rests with the United States alone is completely unjustified.* Soviet history, doctrine, and programs all indicate that the Soviets are likely (and better prepared than we) to initiate a widespread antiballistic missile (ABM) deployment whenever they deem it to their advantage.

10. The long-term course of Soviet military policy plans and programs is uncertain in detail, but unless there is a major change in their political goals, the Soviets are highly likely to continue to aim at being able to defeat any combination of external enemies.

- The Soviets will almost certainly continue to maintain and upgrade their large air defenses and to conduct programs for R&D and modernization of their ballistic missile defenses. These activities will increasingly create uncertainty about the ability of U.S. missile forces to penetrate without countermeasures, and about the possibility of a sudden (open) or gradual (clandestine) Soviet breakout from the ABM Treaty constraints. The importance of such uncertainty is intensified because of the substantial Soviet investments in air defense and passive defenses of elements of the Soviet military and government. Even without violating ABM Treaty constraints, the Soviets will probably deploy a substantial ATM defense, exacerbating our problems in theaters of operations and making them more difficult to correct.

- On the other hand, if the Soviets believe that a Western deployment of defenses will substantially improve the West's capability to resist attack or coercion, they will try to prevent a Western deployment through political means or arms negotiations.

- If the United States deploys defensive systems, the Soviets will probably seek to maintain their offensive threat through a set of measures that will depend on their assessment of the defenses and their own technological options. Depending on the defense effectiveness and leverage, such a response may not fully restore Soviet offensive capabilities.

- If, over time, the Soviets become convinced that the West has the resolve and ability to block Soviet achievement of their long-term goals of destabilization and domination of other states, they may move from their present political/military policies to become more willing to agree to reducing the nuclear threat, through a combination of mutual restrictions on offensive forces and deployment of defensive systems.

B. SUPPORTING RATIONALE

President Reagan's directive to assess the role of defensive systems has required the FSSS to consider the relation of these systems to our strategic objectives and to Soviet programs and policy. The role of intermediate defensive systems has been a major focus of our study.

1. *The Need for Defensive Systems in our Security Strategy*

There is a broad consensus that reliance on nuclear retaliatory threats raises serious political and moral problems, particularly in contingencies where the enemy use of force has been constrained. Technologies for defensive systems and those for extremely precise and discriminating attacks on strategic targets have been advancing very rapidly. (Many technologies are common to both functions.) Together they offer substantial promise of a basis for protecting our national security interests, and those of our allies, that is more humane and more prudent than sole reliance on threats of nuclear response. The case for increasing the emphasis on defensive programs in our national security strategy rests on several grounds, in addition to the broad, long-term objectives mentioned by the President in his March 23 speech:

- The massive increase in Soviet power at all levels of conflict is eroding confidence in the threat of U.S. nuclear response to Soviet attacks against our allies. A continuation of this erosion could ultimately undermine our traditional alliance structure.

- If the Soviet Union persists in the buildup of nuclear offensive forces, for the next decade and beyond the United States may not wish to restore, by offensive means alone, a military balance consistent with our strategic needs. Soviet willingness and ability to match or overmatch increases in U.S. nuclear forces suggest that while additions to our forces are needed to maintain the continued viability of our nuclear deterrent, such additions alone may not preserve confidence in our alliance guarantees.

- The public in the United States and other Western countries is increasingly anxious about the danger of nuclear war and the prospects for a supposedly unending nuclear arms race. Those expressing this anxiety, however, frequently ignore the fact that

the U.S. nuclear stockpile has been declining, both in numbers and in megatons, while Soviet forces have increased massively in both. A U.S. counter to the Soviet buildup that emphasized increases in U.S. nuclear stockpiles would exacerbate public anxieties.

- Arms agreements, despite widespread Western hopes for them, have to date failed to prevent growing instability in the balance—and the deterioration—in the Western position relative to the East. Offensive force limitation agreements, originally associated in the U.S. arms control strategy with the ABM Treaty, have failed to restrain the Soviet offensive buildup; *de facto* reductions in the explosive yield and size of U.S. strategic nuclear stocks have not prevented vast increases in the size and destructiveness of the Soviet stockpile.

- Rapidly advancing technologies offer new opportunities for active defense deployment against ballistic missile attack that did not exist when, over a decade ago, the United States abandoned plans for defense deployments against nuclear attack. Technologies for sensing and discrimination of targets, directing the means of intercept, and destroying targets have created the possibility of a system of layered defenses that would pose successive, independent barriers to penetrating missiles. There has been improvement in some (not all) aspects of defense vulnerability. Given successful outcomes to development programs and robustness in the face of Soviet countermeasures, such defenses would permit only a very small proportion of even a very large attacking ballistic missile force to reach target. Such defenses might also offer high leverage in competing with offensive responses.

2. *Ballistic Missile Defenses in the Soviet Union*

The Soviets maintain a high level of activity in programs relevant to defenses against nuclear attack including:

- Active programs for modernizing deployed air and ballistic missile defense systems which together give them the basis for a very rapid deployment of widespread ballistic missile defenses, if they decide to ignore ABM Treaty obligations completely and openly.

- Large and diverse R&D programs in areas of technology for advanced ballistic missile and air defense systems.

- A space launch capacity significantly greater than our own, if not as sophisticated.

A substantial Soviet lead in deployed defensive systems, superimposed on their growing offensive threat against our nuclear offensive forces, could destroy the stability of the strategic balance.

The decision to initiate widespread deployment of ballistic missile defenses does not rest with the United States alone. The common assumption that it does is completely unjustified. The Soviets give every appearance of preparing for such a deployment whenever they believe

they will derive significant strategic advantage from doing so. Their activities include some that are questionable under the ABM Treaty. Unless the public is aware and kept aware of Soviet activities in this area, the United States will probably be blamed for initiating "another round in the arms race." The state of U.S. preparedness to deploy capable defenses will be an important element in the Soviets' assessment of their own options. Active U.S. R&D programs on advanced defensive systems can assist in deterring a Soviet deployment designed to exploit an asymmetry in their favor.

3. *Alternative Paths to the President's Objective*

The path to the President's ultimate objective may be designed to go directly toward the ultimate objective of a full, multilayered system that offers nearly leakproof defenses against very large offensive forces. Under some conditions such a path might be an optimal use of limited R&D resources, concentrating first on those technologies that present the greatest difficulty and require the greatest lead times.

Alternatively, R&D programs might be designed to provide earlier options for the deployment of intermediate systems, based on technologies that can contribute to the ultimate objective, as such systems become technically feasible and offer useful capabilities. Such a path toward the President's ultimate goal might generate earlier funding demands to support deployment of intermediate systems and would require early treatment of some of the policy issues. Also, at least one variant considered in our report, an ATM deployment for theaters of operations, could be undertaken without modification of the ABM Treaty.

The principal benefits of an R&D path providing options for earlier, partial deployments are:

- Possibilities for an early contribution to improving the deteriorating military balance.
- Its explicit provision of a hedge against the risks inherent in a program where each of a large number of demanding technological goals must be met in order to realize any useful result at all.
- The likelihood that early deployments of parts of the ultimate system may also prove to be the most effective path to achieving such a system; early operational experience with some system elements can contribute useful feedback to the development process.

4. *Intermediate Defensive Systems, Soviet Strategy, and Deterrence*

Fundamentally, the choice between the two paths depends on the utility of intermediate systems in meeting our national security objectives. In the discussion of ballistic missile defenses that preceded the U.S. proposal of the ABM Treaty, opponents of such defenses argued that the utility of widespread defense deployments should be judged in terms of their ability to protect population from large attacks aimed primarily at urban-industrial areas. Because of the destructiveness of nuclear weapons, nearly leakprook defenses are required to provide a high level of protection for population against such attacks. Moreover, opponents at that time also divided our strategic objectives into two categories: deterrence of war and limiting

damage if deterrence failed. They relegated defenses exclusively to the second objective and ignored the essential complementarity between the two objectives. Consequently, they assigned defenses no role in deterrence.

We have reexamined this issue, and we conclude that defenses of intermediate levels of capability can make critically important contributions to our national security objectives. *In particular, they can reinforce or help maintain deterrence by denying the Soviets confidence in their ability to achieve the strategic objectives of their contemplated attacks as they assess a decision to go to war.* By strengthening deterrence *at various levels of conflict,* defenses can also contribute valuable reassurance to our allies.

Deterrence rests on the Soviets' assessment of their political/military alternatives. This, in turn, depends on their objectives and style in planning for and using military force. It also depends on their estimates of the effectiveness of weapons and forces on both sides. Soviet assessments on these matters may differ sharply from our own. Specifically, the past behavior of the Soviets suggests they credit defensive systems with greater capability than we do. If true, this will increase the contribution of defensive systems to deterrence.

Because of the long lead times, assessment of the strategic role of defenses also requires very long-term projections about the nature of the Soviet state. While such projections cannot be made with confidence, there is no current basis for projecting a fundamental change in the Soviet attitude toward external relations. We consider below the possibility that appropriate management by the West of its long-term relations with the Soviets might induce a fundamental change. Desirable as this goal is, the most probable projection for the foreseeable future is that they will continue to set a high priority on their ability to control, subvert, or coerce other states as the basis for their foreign relations. In this case, military power will continue to play a major role for the Soviets, and many present elements of style in the application of that power can be expected to persist:

- Domination of the Eurasian periphery is a primary strategic objective. The Soviets' preferred mode in exploiting their military power is to apply it to deter, influence, coerce—in short, to control—other states, if possible without combat. But the ability to so apply this power depends on strength in actual combat.

- The Soviet objective in combat is victory, defined as survival of the Soviet state and military power (with as little damage as possible) and the imposition of the Soviet will on opponents. Soviet doctrine and practice contemplate limited war, viewed in terms of Soviet ability to impose limitations on opponents for Soviet strategic advantage.

- Soviet plans unite the roles of various elements of military forces in a coherent strategic architecture, embracing offense, defense, and combined arms in various theaters of operations. Destruction of an enemy is subordinate to the achievement of the goal of victory. The Soviets' concept for use of strategic offensive and defensive capability is, consequently, to deter attacks by U.S. intercontinental forces, to separate the United States from its allies in the Eurasian periphery, and to limit damage in the event that U.S. offensive forces are used against the Soviet Union.

- Uncertainty is a dominant factor in all combat, creating an unlimited demand for superiority in forces. Soviet planners seek ways to control uncertainty but, faced with uncertainty over which they cannot exercise a high degree of control, Soviet military action may be deterred. Uncertainties are particularly important in technically complex interactions between offense and defense.

Such a view of military force and its political applications may appear inconsistent with Soviet threats of inevitable apocalyptic destruction in the event of war at any level—but such threats are intended to play on the fears of the Western public. While very great destruction might in fact result from Soviet attacks, the discussion above suggests that the Soviets give priority to military targets. In the absence of defenses, their massive offensive forces make it possible for them to attack large numbers of targets, including urban-industrial targets as well as high-priority military targets.

Whether they would conduct such attacks from the outset or withhold attacks against urban-industrial targets to deter U.S. retaliation must be a matter of conjecture. In any case, intermediate levels of defense capability might deny them the ability to destroy with high confidence all of their high-priority targets and force them to concentrate their attack on such targets, diverting weapons that might otherwise be directed against cities. Moreover, if defenses can deny the Soviets confidence in achievement of their military attack objectives, this will strengthen deterrence of such attacks. Thus, to the extent that such attacks are necessary to overall Soviet plans, defenses can help deter lower levels of conflict.

5. *The Military Utility of Intermediate Defensive Systems*

Defensive systems affect attack planning in a variety of ways, depending on the characteristics and effectiveness of the defenses, the objectives of the attack, and the responses of the defense and offense to the measures adopted by the other side.

Any defense system can be overcome by an attack large enough to exhaust the intercept capability of the defense. The size of attack against which the defense is designed is therefore one major characteristic of a defensive system. The cost of expanding the defense to deal with a given increase in the size and cost of the offense is a measure of the leverage of the defense. Another characteristic is its effectiveness—its probability of destroying an offensive missile.

If the defense has sufficiently high capacity, effectiveness, and leverage, it can of course essentially preclude attacks. Such defenses may result from the R&D programs pursuant to the President's goal, but it is more likely that the results will be more modest. Even a modest level of effectiveness—for example, a kill probability of 0.5 for each layer of a four-layer defense—yields an overall "leakage" rate of only about 6 percent for an attack size that does not exceed the total intercept capacity of the various layers. Such a leakage rate is, of course, sufficient to create catastrophic damage in an attack of, say, 5,000 reentry vehicles (RVs) aimed at cities. It would mean 300 RVs arriving at targets—sufficient to destroy a very large part of our urban structure and population even if distributed in a nonoptimal fashion from the point of view of the offense.

Against an extensive military target system, however, with an attack objective of destroying large fractions of specific target sets (such as critical C^3I facilities) with high confidence,

such a leakage rate would be totally inadequate for the offense. The more specific the attack objectives and the higher the confidence required by the offense, the greater the leverage exacted by the defense. For example, in the previous four-layer case, if the defense required a high-confidence penetration against a specific target, it would need to fire at least 30 RVs to a single target since the defense firing doctrine is unknown to the attacker. As these are expected-value calculations, an attacker would have to double or triple the above values to attain high confidence in killing a specific target. Clearly an attacking force of 5,000 RVs that could destroy a very large military target system in the absence of defenses would be totally inadequate to achieve high confidence of destruction of a large fraction of a defended target set amounting to hundreds of targets. Yet, this is precisely what is required to achieve the strategic objectives of a large-scale nuclear attack.

The situation is even more dramatic in the case of limited attacks on restricted target systems, intended to achieve a decisive strategic advantage while continuing to deter further escalation of the level of nuclear attack. Such attacks would be precluded entirely by defenses of the sort discussed, would deny the attacker's confidence in the outcome, or would require a level of force inconsistent with limiting the level of violence, while depleting the attacker's inventory available for other tasks.

Offense and defense have a rich menu of responses from which they can choose. These include fractionation of payload to increase the number of warheads for a given missile force, the use of decoys, and the use of preferential offense or defense tactics. The outcome of the contest is likely to be uncertain to both sides so long as the defense keeps pace with additions to offensive force size by expanding its intercept capacity and upgrading its critical subsystems. Uncertainty about the offense-defense engagement itself contributes to deterrence of attack by denying confidence in the attack outcome.

We have considered the effect of introducing defenses in hypothetical representative military situations, taking account of what we know of Soviet objectives and operational style in combat. In their doctrine, the Soviets stress operations designed to bring large-scale conflict to a quick and decisive end, at as low a level of violence as is consistent with achievement of Soviet strategic aims. To achieve this objective in a conflict involving NATO, a major aspect of their operations is intense initial attacks on critical NATO military targets in the rear, particularly those relevant to NATO's theater nuclear capabilities and air power. Such attacks (including those in the nonnuclear phase of combat) are intended to contribute to Soviet goals at that level, to reduce NATO's ability and resolve to initiate nuclear attacks if the nonnuclear defense fails to hold, and to assist in nuclear preemption of a NATO nuclear attack. High confidence in degrading NATO air power is also essential to support utilization of Soviet operational maneuver groups designed to disrupt NATO rear areas.

The Soviets plan to use a wide variety of means to accomplish this task. Tactical ballistic missiles (TBMs) are taking an increasing role in this mission during the initial stages of either nuclear or nonnuclear combat as their accuracy increases and the sophistication of high-explosive warheads increases. Inability to destroy critical target systems would cast doubt on the feasibility of the entire Soviet attack plan, and so contribute to deterrence of theater combat, nuclear or nonnuclear.

In the event of imminent or actual large-scale conflict in Europe, another high priority Soviet task would be to prevent quick reinforcement and resupply from the United States.

Early and obvious success in this respect, by demonstrating the hopelessness of resistance, might abort European resistance altogether or end a conflict in its very early stages. In the absence of defenses, the Soviets might attempt this task by nonnuclear tactical ballistic missile attacks on reception facilities in Europe. The Soviets could also accomplish this task with higher confidence by means of quite limited nuclear attacks on such facilities in Europe and on a restricted set of force projection targets in CONUS.

While the risk of provoking large-scale U.S. response to nuclear attacks on CONUS might be unacceptable to the Soviets, they might also feel that—given the stakes, the risks of escalation if conflict in Europe is prolonged, and the strength of their deterrent to U.S. initiation of a large-scale nuclear exchange—the *relative* risks might be acceptable if the attack size were small enough and their confidence of success sufficiently high. Without defenses, very small numbers of ballistic missiles could in fact achieve high confidence in such an attack. However, an intermediate ballistic missile defense deployment of moderate capabilities could force the Soviets to increase their attack size radically. This would reduce or eliminate the Soviets' confidence that they could achieve their attack objectives while controlling the risks of a large-scale nuclear exchange. The role of intermediate defenses in large-scale nuclear attacks has already been discussed at the beginning of this section.

Soviet response to prospective or actual defense deployments by the United States also will have longer-run aspects. The Soviets' initial reaction will be to assess the nature, effects, and likelihood of a U.S. defense deployment. Barring fundamental changes in their conception of their relations to other states and their security needs, they will seek to prevent such a deployment through manipulation of public opinion or negotiations over arms agreements. (We consider the possibility of a fundamental change in Soviet political/military objectives in the discussion of arms agreements below.)

If the Soviets fail to prevent the deployment of defenses, they will assess their alternative responses in the light of the strategic architecture discussed above, the effectiveness and leverage of the U.S. ballistic missile defenses, and other relevant U.S. offensive and defensive capabilities (e.g., air defense). If the new defensive technologies offer sufficient leverage against the offense and they cannot prevent the West from deploying defensive systems, the Soviets may accept a reduction in their long-range offensive threat against the West, which might be reflected in arms agreements. In this case, they would probably seek to compensate by increasing their relative strength in other areas of military capability. Their current program emphases suggest that they would be more likely to respond with a continuing buildup in their long-range offensive forces. However, such a buildup would not necessarily be sufficient to maintain their current level of confidence in the achievement of the strategic objectives of those forces.

6. *Managing the Long-Term Competition with the Soviet Union*

Current Soviet policy on arms agreements is dominated by the Soviet Union's attempt to derive unilateral advantage from arms negotiations and agreements, by accepting only arrangements that permit continued Soviet increases in military strength while using the negotiation process to inhibit Western increases in military strength. There is no evidence that Soviet emphasis on competitive advantage over mutual benefit will change in the near future, unless a fundamental change occurs in the Soviet Union's underlying foreign policy objectives. Such

a change might be induced in the long run by a conviction among Soviet leaders that the West was able and resolved to block the Soviet Union's attempts to extend its power and influence by reliance on military strength. If such a change occurred, the possibilities for reaching much more substantial arms agreements might increase. In that event, it might also be possible to reach agreements restricting offensive forces so as to permit defensive systems to diminish the nuclear threat. Soviet belief in the seriousness of U.S. resolve to deploy such defenses might itself contribute to such a change.

7. *Defenses and Stability*

Deployment of defensive systems can increase stability, but to attain this we must design our offensive and defensive forces properly—and, especially, we must not allow them to be vulnerable. In combination with other measures, defenses can contribute to reducing the prelaunch vulnerability of our offensive forces. To increase stability, defenses must themselves avoid high vulnerability, must be robust in the face of enemy technical or tactical countermeasures, and must compete favorably in cost terms with expansion of the Soviet offensive force. A defense that was highly effective for an attack below some threshold but lost effectiveness very rapidly for larger attacks might decrease stability if superimposed on vulnerable offensive systems. Boost-phase and midcourse layers may present problems of both vulnerability and high sensitivity to attack size. Nevertheless, if this vulnerability can be limited through technical and tactical measures, these layers may constitute very useful elements of properly designed multilayered systems where their sensitivity is compensated by the capabilities of other system components.

8. *A Perspective on Costs*

We do not yet have a basis for estimating the full cost of the necessary research program nor the cost of systems development or various possible defensive deployment options. It is clear, however, that costs and the tradeoffs they require would present important issues for defense policy. While not insignificant, total systems costs would be spread over many years. There is no reason at present to assume that the potential contributions of defensive systems to our security would not prove sufficient to warrant the costs of deploying the systems when we are in a better situation to assess their costs and benefits.

ARTICLE TWO - "STRATEGIC DEFENSE: AVOIDING ANNIHILATION"

The article, "Strategic Defense: Avoiding Annihilation," was written by Robert Foelber and published in November 1983. Mr. Foelber is a strategic weapons analyst for the Heritage Foundation (9:4).

Mr. Foelber's rationale for a US BMD is woven thoughout his article. His main theme is that a US BMD strengthens the US and USSR stategy of deterring one another from war by maintaining the capability to destroy one another. He believes there are six reasons why the US should deploy a BMD. First, the Soviet defense capability must be offset by a US stategic defense. Mr. Foelber cites the funding and buildup of Soviet defense capability in three areas: air defense, civil defense, and ABM defenses. In addition to enhancing US force and population survival, US development of a BMD may influence the Soviets to channel funds into defense systems, thus improving offensive nuclear arms control. Second, his article states ". . . strategic defense would reduce the inherent uncertainty of deterrence through retaliation." A BMD may increase the opportunity to avoid nuclear escalation if the Soviets are unwilling to risk an attack against the US. Third, US security through deterrence is strengthened because deterrence by retaliation is coupled with deterrence that denies successful attack by the adversary. Fourth, it is wise to plan for the possibility that deterrence of the Soviets may fail. A strategic defense plans for that possibility. Foelber states that the USSR military doctrine and lack of respect for life does not preclude them from potentially attacking the US. Foelber's fifth reason for a strategic defense is that a BMD is morally correct. The best approach to deter a war is without the threat to lives of millions of people. Foelber's sixth reason for a defense is also a moral issue. He believes the policy of leaving the citizens of the US defenseless is not justified. He implies it is our responsibility to protect ourselves from potential mass destruction. His argument for a strategic defense does not end with these six reasons.

Foelber addresses misconceptions about a strategic defense and argues for a US defense. He argues against the need for a leak-proof US defense and against the argument that the Soviets would respond to a US defense by deploying more offensive nuclear weapons. He also disagrees with the beliefs that a US defense would make the Soviets attack civilians with their missiles, that a US defense is solely a space-based system, and that the US cannot afford an effective strategic defense system. Finally, he argues that a strategic defense will not be destabilizing in the world or increase the chances of war. He believes just the opposite is true. A defense

would restore the strategic balance of power and produce stability. As a result, Foelber concludes that funding and developing plans for a strategic defense must not be postponed.

Mr. Foelber's article was copied from the November 1983 edition of Backgrounder and starts on the following page.

Backgrounder
The Heritage Foundation

The Heritage Foundation 214 Massachusetts Avenue N.E. Washington, D.C. 20002 (202)546-4400

November 9, 1983

STRATEGIC DEFENSE: AVOIDING ANNIHILATION

INTRODUCTION

How can the U.S. protect itself from nuclear attack? Mutual deterrence based on a superpower balance in offensive nuclear capability is one means, and for years the U.S. has bet its future on this potentially unstable and disastrous scheme. It depends on the morally questionable practice of deliberately leaving the American people unprotected from a Soviet attack, and it ignores the fact that the Soviet Union is investing heavily in defenses to protect itself from U.S. nuclear retaliation.

There is another way of protecting the U.S.--it is called strategic defense. It is more moral than deterrence based on retaliation and more certain to deter nuclear war, for it does not use civilian lives as hostages in the hope that this would deter attack. Strategic defense instead creates a shield that actually protects Americans from incoming Soviet missiles and bombers. For those rightly horrified by the devastation of nuclear holocaust, it offers a means of preventing nuclear attack, while keeping the nation secure.

After years of neglecting it, Washington now is taking a hard look at strategic defense. It was at the core of President Reagan's March 23, 1983, speech endorsing space based ballistic missile defense. It has been endorsed by two study teams of prominent scientists and strategists in recent reports to the White House.[1]

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1 The Defense Technologies Study Team, chaired by James C. Fletcher, former head of the National Aeronautics and Space Administration (NASA), and the Future Security Strategy Study, headed by Fred S. Hoffman, director of a think tank called Pan Heuristics. See Clarence A. Robinson, Jr., "Panel Urges Defense Technology Advocacy," Aviation Week and Space Technology, October 17, 1983, pp. 16-18.

The high risk that a U.S.-Soviet conflict will escalate to all-out nuclear war, Soviet paranoia about security matters, and the massive continuing Soviet buildup in nuclear warfighting capability make it extremely imprudent for the U.S. to let its security rely solely on an increasingly lopsided "balance" of strategic offensive capability, as is current U.S. policy. Strategic defense is imperative--the only solution to the moral dilemma posed by nuclear deterrence, a matter of grave concern to the U.S. Roman Catholic bishops and others.

Critics of current strategic defense proposals use aging arguments that were voiced in the late 1960s during the heated debate over deployment of anti-ballistic missile (ABM) systems for population defense. Their principal contention is that successful defense against anything greater than a small-scale nuclear attack is impossible. In the age of nuclear missiles, it is argued, the advantage inherently belongs to the offense. This might have sounded true 15 years ago; it is very dubious today.

The Administration's space weapons study group of leading technical experts (the Fletcher Commission) has concluded that effective space based ballistic missile defense (BMD) using a variety of technologies, including directed energy weapons (DEWs), can be deployed at an affordable cost.[2] The technology for more traditional ground based defense against ballistic missiles and defense against low flying bombers and cruise missiles also has advanced considerably since the days of Nike-Hercules, Sprint, and Spartan. With a comprehensive set of strategic defense programs, including multiple layers of ballistic missile defenses, air defenses, and civil defense measures, assured survival against even a massive Soviet nuclear attack now seems achievable.

In addition to technical criticism, arms control considerations also are used by opponents of strategic defense, who contend that it is destabilizing (that is, makes war more likely). This argument, too, collapses under scrutiny. Indeed, the critics' view that deterrence must be based on population vulnerability is a major reason for today's dangerous strategic imbalance and the lack of a timely U.S. response.

Since deployment of robust strategic defenses will take some time, the U.S. must continue in the short run to rely for deterrence on offensive nuclear weapons, which must be made more survivable. But strategic defense rightfully concerns Congress, the Administration, and the American people, for it offers, at last, protection from nuclear attack that does not threaten the lives of one hundred million Americans. It fulfills a government's primary responsibility--to protect its citizens.

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2 Ibid.

WHAT IS STRATEGIC DEFENSE?

The goal of strategic defense is to increase the prospects of survival of the U.S. homeland against even large-scale nuclear attack.[3] It involves limiting the possibility of damage to key national assets: the U.S. population, government institutions, residential and commercial property, industry, farmland, transportation systems, and so on. Damage limitation can be accomplished in two ways: (1) by destroying enemy nuclear forces (intercontinental ballistic missiles, ICBMs; submarine launched ballistic missiles, SLBMs; bombers) before they are launched; and (2) by defending against these weapons after they have been launched.

Having correctly rejected the option of a preemptive strategic nuclear strike, the U.S. can limit damage to itself, using offensive weapons only, by attacking Soviet post-first strike forces (those remaining after a Soviet first strike). The U.S. capability to destroy Soviet offensive nuclear weapons is severely limited today in part because most U.S. ICBMs--the major counterforce weapons in the U.S. strategic arsenal--would be destroyed in a Soviet first strike. Deployment of the Trident II submarine launched ballistic missile (SLBM) and deployment of U.S. ICBMs in a survivable basing mode would enhance somewhat U.S. capability to limit U.S. damage through destruction of Soviet reserve offensive forces. Nevertheless, in light of America's second strike nuclear policy, the major burden of damage limitation for the U.S. must rest with strategic defense, which has four major components:

1) strategic and tactical warning of Soviet attack;[4]

2) defense against ballistic missiles, using space based and ground based weapons systems firing directed energy laser and particle beams, nuclear missiles, high velocity impact rockets, or other traditional defensive weapons;

3) defense against enemy bombers and low-flying cruise missiles, using surface-to-air missiles (SAMs) and manned interceptors armed with both guns and air-to-air missiles (AAMs); and

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[3] There are other good reasons for deploying strategic defenses: to protect the U S. against small-scale nuclear attacks from minor nuclear powers, such as the People's Republic of China, to prevent accidental nuclear war, to defend U.S. strategic forces against a Soviet first strike, or to complicate Soviet war planning. The heart of the current debate over strategic defense, however, is: can and should the U.S. defend itself against a large-scale Soviet nuclear attack?

[4] For strategic warning (warning of impending attack before it is launched) the U.S. relies on intelligence about general Soviet military and civilian mobilization activity gathered from a variety of sources. For tactical warning (warning of an attack in progress) the U.S. relies primarily on early warning Defense Support Program (DSP) satellites equipped with infrared sensors to detect rocket firings and some ground-based radars to detect SLBM launches.

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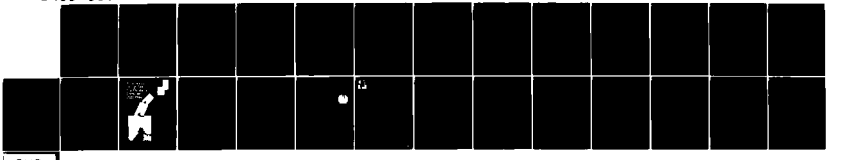

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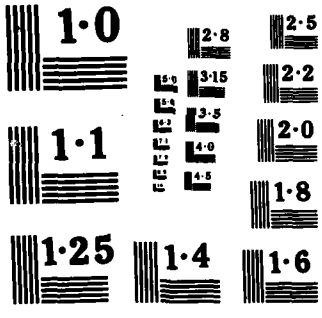
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4) civil defense through blast shelters, fallout shelters, city evacuation, and industrial hardening and dispersal.[5]

STRATEGIC DEFENSE IN U.S. DEFENSE POLICY

The U.S. has not always been defenseless against nuclear attack. During the 1950s and early 1960s, the joint U.S. and Canadian North American Aerospace Defense (NORAD) Command maintained a vast air defense system of 2,612 interceptors, 180 surface-to-air missile batteries, and about 600 radars, all that was needed to successfully defend U.S. cities against Soviet bombers--the only Soviet strategic nuclear threat at the time.[6] During the 1960s the U.S. seriously contemplated deployment of a nationwide ABM system and investigated technology for a space based defense system.[7] Civil defense spending reached its peak in 1962--$500 million (1977 dollars)--for evacuation planning, shelter identification, and the stockpiling of survival kits.[8]

With the deployment of large numbers of Soviet ICBMs after the mid-1960s, nationwide anti-ballistic missile (ABM) protection was abandoned by the U.S. government because of the widespread belief that successful ballistic missile defense of the entire nation was technically infeasible and destabilizing. Opponents of ABM held the view, commonly accepted by critics of strategic defense today, that the essence of deterrence is mutual assured destruction (MAD)--the capability of each side to destroy the other side as a viable society. Although the U.S. government has never accepted MAD as the basis for U.S. nuclear weapons targeting or war planning,[9] MAD has been used by civilian strategists and

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5 For an overview of strategic defense components and a comparison between U.S. and Soviet efforts, see John M. Collins, U.S.-Soviet Military Balance: 1960-1980 (New York: McGraw Hill, Inc., 1980), pp. 154-175.

6 For a discussion of U.S. air defenses, past and present, see U.S. House of Representatives, Committee on Armed Services, Full Committee Hearing on Continental Air Defenses, July 22, 1981; Collins, op. cit., and "NORAD--A Study in Evolution," International Defense Review, vol. 3 (1974), pp. 15-19.

7 The first U.S. ABM system involved Nike-Zeus interceptors (tested 1959-1962) and mechanically manipulated radars. This was superseded by the Nike-X system which used high-speed, short-range missiles for point defense and phased array (electronically scanning) radars. Spartan missiles, for intercepting Soviet warheads outside the atmosphere--an essential requirement for city defense--were added later to the system, which as the Sentinel program was proposed for deployment at 17 sites for "thin area" defense of the U.S. homeland against small-scale nuclear attacks. See John Collins, United States and Soviet City Defense (Washington, D.C.: U.S. Government Printing Office, 1976), pp. 73-82.

8 "Only half the spaces were ever marked or stocked with the simplest survival kits." Ibid., p. 89.

9 For an historical review of U.S. strategic doctrine and targeting policy, see Aaron L. Friedberg, "A History of U.S. Strategic 'Doctrine'--1945 to 1980," Journal of Strategic Studies, vol. 3 (December 1980), pp. 37-71.

the Congress as the standard for structuring U.S. strategic nuclear force deployments and served to justify a U.S. policy of population vulnerability.

Research and development, nevertheless, continued on ABM systems for the less demanding role of protecting U.S. strategic nuclear forces from a potential Soviet first strike, as even according to MAD, deterrence requires survivable nuclear forces to retaliate after an aggressor's first strike. In 1969, Congress approved funding for two sites of the proposed 12-site Safeguard system for defense of U.S. strategic forces.[10] The 1972 ABM Treaty, amended in 1974, however, restricted deployment of ABM interceptors to 100 at one site and banned space based ABM interceptors, thus preventing the U.S. by international treaty from defending either its citizens or strategic forces against Soviet missile attack.

U.S. support of the ABM Treaty was officially linked to an expected follow-on agreement, which was to prevent the Soviets from deploying ICBMs capable of threatening U.S. strategic retaliatory forces.[11] The U.S., however, failed to win Soviet approval of such an agreement, and after 1975, the Soviet Union deployed large numbers of multiple warhead ICBMs not prohibited by SALT I or SALT II, which have put U.S. ICBMs at extreme risk and added substantially to Soviet megatonnage. Instead of proceeding with deployment of ABM interceptors to protect its ICBMs, the U.S. cut back on ABM research and development, virtually phased out its air defenses, and reduced civil defense to an organization without a serious national program.[12]

During the late 1970s, interest in strategic defense revived somewhat when the Carter Administration, concerned about the growing Soviet nuclear warfighting capability, turned again to the need to limit damage to the United States. Presidential Directive-41, signed in 1978, recognized civil defense as an element in the strategic balance that could enhance deterrence and stability, an idea endorsed by Congress in a 1980 amendment

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10 Safeguard used the basic components of Sentinel: high acceleration, nuclear missiles for intercepting Soviet warheads in the atmosphere (Sprint), nuclear missiles for intercepting Soviet missiles outside the atmosphere (Spartan), Perimeter Acquisition Radars (PARs) for warhead detection and tracking, Missile Site Radars (MSRs) for battle management, and data processing computers.

11 U.S. Unilateral Statement A of the ABM Treaty states: "If an agreement providing for more complete strategic offensive arms limitations were not achieved within five years, U.S. supreme interests could be jeopardized. Should that occur, it would constitute a basis for withdrawal from the ABM Treaty."

12 In 1981 NORAD had 307 interceptor aircraft, no SAMs, only 111 functioning radars, and the capability only to protect the sovereignty of U.S. airspace in peacetime. Continental Air Defense, p. 25. See also "Neglect of Bomber, Missile Defense Hit," Aviation Week and Space Technology, August 20, 1979, p. 64. The civil defense budget between 1969 and 1979 was $100 million (1977 dollars) a year.

to the Federal Civil Defense Act of 1950.[13] Funding for research and development of ground based ABM systems was increased with focus on two programs: Sentry, designed for low level defense of hardened strategic assets; and the Army's Overlay system for intercepting Soviet missiles in space with small homing non-nuclear rockets.[14] In response to the alarming surge in Soviet space weapons effort, the Carter Administration increased funding for space laser technology with a limited potential for ballistic missile defense.

The Reagan Administration has placed even greater emphasis on strategic defense. It has requested substantially more funding for civil defense ($4.2 billion over seven years),[15] about $8 billion for procurement of 100 F-15 fighters, additional E-3 airborne warning and control (AWACs) aircraft, Patriot SAMs for air defense, and more R&D funding for Sentry, Overlay, and space laser weapons. In the wake of the President's March 23 speech, the White House Science Office, the Defense Department, and a special research team are studying the technological feasibility and the policy implications of protecting the U.S. with space weapons. Some Members of Congress are urging the U.S. government to adopt a national strategy for protecting U.S. civilians in the event of nuclear war.[16] The Administration's interest in strategic defense, however, has yet to be translated into an official U.S. policy commitment to assured survival through a comprehensive, detailed set of programs.

WHY STRATEGIC DEFENSE?

The goals of U.S. strategic planning are to deter nuclear war and to limit damage to the U.S. should deterrence fail. Despite some official public statements endorsing mutual assured destruction (MAD), the U.S. has based deterrence since the early

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13 The 1978 Amendment established the Federal Emergency Management Agency (FEMA).

14 Sentry (formerly LoAD--Low Altitude Defense) consists of small, nuclear armed, high acceleration, interceptors for low altitude intercept and large numbers of small, mobile, or silo based phased array radars. The Army's Overlay system would involve the launch of an optical probe on warning of Soviet attack to detect Soviet missiles in space followed by launch of ABM missiles armed with many radar or optically guided submunitions for destroying Soviet warhead "buses." Clarence A. Robinson, Jr., "Layered Defense System Pushed to Protect ICBMs," Aviation Week and Space Technology, February 9, 1981, pp. 82-86.

15 National Security Decision Directive (NSDD)-26 calls for survival of a significant portion of the American people in the event of nuclear war.

16 Rep. Ken Kramer (R-CO) and over eleven cosigners, for example, have submitted the so-called People Protection Act (H.R. 3073) "to implement the call of the President for a national strategy seeking to protect people from nuclear war...."

1960s primarily on being able to destroy the USSR's military capability to fight and win a nuclear war. Primary targets of U.S. nuclear weapons are Soviet strategic and theater nuclear forces, conventional forces, political and military command and control centers, and vital war supporting industries. The Scowcroft Commission and nuclear strategists in both Democrat and Republican administrations over the past ten years have acknowledged that the capability to threaten these targets with controlled, limited retaliatory strikes is essential for stable deterrence, since it gives the U.S. President retaliatory options other than attacking Soviet cities, which would almost certainly lead to a Soviet attack on U.S. cities.

America's capability to implement its so-called countervailing strategy, however, is dangerously weak because the U.S. strategic command and control structure and the U.S. ICBM force are vulnerable to a Soviet first strike. It is vital for stable deterrence that the U.S. move quickly to enhance the survivability of the offensive components of the U.S. deterrent force. At the same time, however, the U.S. must augment its strategic nuclear force posture with deployment of defenses capable of ensuring survival of U.S. homeland in a nuclear war. Here are six reasons why:

1. Strategic defense is necessary to offset Soviet defense efforts.

The Soviet Union has never accepted the dominant American view that security is enhanced by having a vulnerable society. In 1967, Soviet Premier Aleksei Kosygin rejected U.S. proposals to limit ABM systems on grounds that defense against missile attack "is not a cause of the arms race but represents a factor preventing the death of peoples." The Soviet Union signed the 1972 ABM Treaty not because it accepted mutual population vulnerability, as some U.S. analysts contended at the time, but more likely because it feared that an active U.S. ABM system would interfere with its objective of acquiring a first strike capability against U.S. nuclear forces.[17] Official Soviet military writings since 1972 continue to stress the desirability of strategic defense, and Soviet investment in air defenses, civil defense, and ABM systems has been extensive.[18]

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17 See Carnes Lord, "The ABM Question," Commentary, May 1980, p. 34. See also Robert P. Berman and John C. Baker, Soviet Strategic Forces: Requirements and Responses (Washington, D.C.: The Brookings Institution, 1983), p. 149.

18 For a discussion of Soviet attitudes toward ballistic missile defense, see Rebecca V. Strode, "Space-Based Lasers for Ballistic Missile Defense: Soviet Policy Options," in Laser Weapons in Space: Policy and Doctrine, edited by Keith B. Payne (Boulder, Colorado: Westview Press, 1983), pp. 106-161. In 1977, 12 percent of the Soviet defense budget was spent on strategic defense and only 8 percent on strategic offensive systems. According to the CIA, the percentage of funds for strategic defense will probably increase in the 1980s as new systems come on line. Strode, p. 136.

The Soviet strategic defense capability is considerable and growing. Moscow deploys 2,600 interceptors, 11,000 surface-to-air missile launchers, and 3,000 air defense radars for air defense. This force is being upgraded with more effective interceptors with look-down/shoot-down radars and missiles, the more capable SA-10 surface-to-air missile (SAM), and airborne warning and control (AWAC) aircraft for defense against low flying U.S. cruise missiles.[19]

The Soviet Union is spending $2.5 billion (ten times the U.S. level) a year on civil defense measures, such as evacuation planning and training, stockpiling of food, medical supplies, and other necessities, construction and maintenance of blast shelters, and protection for industrial equipment.[20] A 1978 Central Intelligence Agency study concluded that, with a few days warning to allow evacuation, Soviet casualties in a large-scale nuclear war could be held to 50 million. With a week's preparation, Soviet civil defense could reduce casualties to levels suffered by the USSR in World War II.[21] The U.S., on the other hand, with virtually no civil defense program would suffer more than 100 million casualties regardless of warning.

The Soviet Union is conducting vigorous research and development on ABM technology and is upgrading the Galosh ABM system around Moscow with new phased array radars and missiles manufactured on mass production assembly lines, which give the Soviet Union the capability to quickly deploy a nationwide ABM system.[22] A number of these upgrades violate the 1972 ABM Treaty.[23]

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19 Clarence A. Robinson, Jr., "Emphasis Grows on Nuclear Defense," Aviation Week and Space Technology, March 8, 1982, p. 36.

20 W. Dale Nelson, "Soviet's Budget for Civil Defense Set at $2.5 Billion," Philadelphia Inquirer, March 18, 1982, p. 6. Some civil defense critics dispute this figure as far too high. See, for example, Les Aspin, "Soviet Civil Defense: Myth and Reality," Arms Control Today, September 1976. If true, however, this merely shows that, as the 1957 Gaither Committee and other study groups have concluded, "no other practicable addition to our defense, regardless of cost, can offer so much of a return (survivability) under as wide variety of conditions (as civil defense)." Quoted in Collins, United States and Soviet Civil Defense, pp. 88-89.

21 Director of Central Intelligence, Soviet Civil Defense (NI78-10003), July 1978, p. 4.

22 The Soviets are deploying a two-tiered BMD system to modernize their Galosh ABM complex with the SH-04 (Spartan-like) exoatmospheric interceptor, the SH-08 endoatmospheric interceptor, and ABM-X-3 mobile, phased array radars. See "Soviets Test Defense Missile Reload," Aviation Week and Space Technology, March 8, 1982, p. 27; Berman and Baker, op. cit., p. 149; and Walter Pincus, "Soviets Believed to Have Problems with New Typhoon Missile," Washington Post, January 18, 1982, p. 15.

23 In particular, the Soviets have tested SAMs in an ABM mode for upgrading air defenses for BMD missions, developed and tested mobile radars and missile launchers, deployed battle management radars for a nationwide ABM

The Soviet Union is the only country with an operational anti-satellite (ASAT) weapon. According to the U.S. Defense Department, it could deploy a prototype orbiting laser ASAT battle station within the next six years providing valuable operational experience for a large-scale space based BMD system which could be deployed by the mid-1990s.[24]

The Soviet Union seems bent on acquiring the capability to limit nuclear war damage to what it considers tolerable levels, which would give the Soviet Union a war winning capability.[25] Two options are available to the U.S. for offsetting Soviet strategic defense deployments and hedging against a possible Soviet ABM breakout: (1) a massive buildup of offensive weapons to defeat Soviet strategic defense; or (2) a more balanced deployment of strategic defenses and modernized offensive weapons to ensure continued deterrence and vastly improved survivability of the U.S. in a nuclear war.

Option (1) would undermine U.S. efforts to achieve deep reductions in nuclear weapons through arms control--a highly desirable objective despite Soviet resistance. Option (2), on the other hand, could make offensive nuclear arms control easier by channeling the Soviet arms buildup into the area of defense forces, and it would have the following other advantages.

2. Strategic defense would reduce the inherent uncertainty of deterrence through retaliation.

Much can and should be done to enhance U.S. capability to limit nuclear war. Even so, it is possible that a U.S.-Soviet conflict could escalate to a massive nuclear exchange with large-scale destruction in the United States. This makes deterrence through offensive power uncertain because in an extreme crisis Soviet leaders might be tempted to launch unlimited nuclear attacks against U.S. nuclear forces in the hope that U.S. leaders would choose surrender rather than risk national suicide. True, Soviet leaders cannot be sure that the U.S. would not retaliate. But doubts about U.S. retaliation undermine its deterrent value.

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system, and tested rapid reload missile lauchers--all in violation of the ABM Treaty. See Manfred Hamm, "Soviet SALT Cheating: The New Evidence," Heritage Foundation Executive Memorandum No. 31, August 5, 1983; "Soviets Test Defense Missile Reload," op. cit., and Senator Steven Symms (R-Idaho), "Soviet Violations of ABM Treaty," Congressional Record, April 14, 1983, pp. S4625-S4627.

24 Craig Covault, "Soviet Antisatellite Treaty Raises Verification Issue," Aviation Week and Space Technology, August 29, 1983, p. 20.

25 For the argument that "Soviet layered defenses are likely to prove workable and highly successful" after a Soviet first strike against vulnerable U.S. nuclear forces, see Daniel Goure and Gordon H. McCormick, "Soviet Strategic Defense: The Neglected Dimension of the U.S.-Soviet Balance," Orbis, Spring 1980, pp. 103-127.

U.S. threats to retaliate must be as credible as possible. Improved U.S. capability to survive massive nuclear attack would reduce the chances of nuclear brinkmanship and enhance deterrence by protecting the U.S. from the effects of nuclear escalation.

3. Strategic defense would strengthen U.S. security with a new kind of deterrence.

In addition to deterrence through retaliation, a potential aggressor can be deterred because his victim's defense can prevent his achieving his goals (deterrence through denial).

Strategic defense would also give the U.S. this new capability of deterrence through denial, strengthening deterrence even more, since an aggressor is less likely to attack if his victim has the capability to avoid damage as well as to retaliate. At minimum, strategic defense would enhance deterrence by introducing significant uncertainties in the minds of Soviet planners about the success of a Soviet first strike.

4. Strategic defense is a needed prudent hedge against deterrence failure.

War between the U.S. and the Soviet Union is not inevitable, but planning for the possibility of deterrence failure is nonetheless prudent. Reasons:

o There is no evidence that the Soviet leaders have abandoned Lenin's dictum that "the existence of the Soviet Republic side by side with the imperialist [Western] states is unthinkable." Soviet leaders are paranoid about their security, and they have amassed significant strategic nuclear, theater nuclear, and conventional force superiority to protect interests that are constantly expanding beyond legitimate bounds with the growth in Soviet military power.

o Soviet leaders cannot be trusted to use their military force with restraint and respect for human life, as illustrated by the Soviet invasion of Afghanistan, Soviet or Soviet sponsored use of chemical weapons in South Asia, the murder of 269 innocent passengers aboard Korean Airlines Flight 007, and numerous other examples of Soviet inhumanity toward its own and other people.

o In contrast to the purely defensive strategy of the Western Alliance, Soviet military doctrine sanctions preemptive strategic nuclear war as a legitimate means of defense, which raises the risk of Soviet initiated nuclear war.[26]

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[26] See John M. Collavelli, "The Role of Surprise and Preemption in Soviet Military Strategy," International Security Review, Summer 1981, pp. 219-236.

5. Strategic defense addresses the moral dilemma of nuclear deterrence.

The U.S. Roman Catholic bishops, in their recent Pastoral Letter on Peace and War, and many others have argued that, from the viewpoint of the traditional Judeo-Christian Just War doctrine, virtually any use of nuclear weapons--second or first, limited or large-scale, countermilitary or countercity--would be immoral because of the likelihood of escalation to all-out war with catastrophic destruction of humanity. This argument cannot be easily dismissed.

This moral conundrum cannot be solved, however, by arms control talks, since the Soviet leaders have consistently rejected U.S. proposals for deep reductions in nuclear arsenals. Nor is dismantling the apparatus of deterrence a solution, since this would make Soviet aggression more likely. The best approach is for the U.S. and the Soviet Union to build up strategic defenses that can deter without threat to the lives of hundreds of millions of innocent U.S. and Soviet civilians.

6. Defense against nuclear attack is a moral duty.

It is a right of all nations, as codified in the U.N. Charter, to defend themselves against external attack. While individual Americans are free to choose to be dead rather than Red, this does not justify U.S. policy that leaves its citizens defenseless against Soviet attack. Critics of strategic defense are concerned solely with a deterrent plan, which makes nuclear war so horrible--because societies are undefended--that no nation will risk such a conflict. This kind of deterrence has three problems: first, the Soviet Union does not subscribe to it, as evidenced by Soviet strategic defense programs; second, it puts too much faith in the rationality and decency of Soviet leaders; third, if it fails, it fails catastrophically. Given the horrible consequences of nuclear war, strategic defense would appear to be the only morally correct policy.

SOME MISCONCEPTIONS ABOUT STRATEGIC DEFENSE

Opponents of strategic defense claim that assured survival against nuclear attack is not possible. Their arguments are flawed by false assumptions.

Flaw One is that strategic defense must be leakproof. Robert S. McNamara, Secretary of Defense from 1961-1968, for example, apparently rejected a nationwide ABM system on grounds that

> none of the ABM systems at the present or foreseeable future state of the art would provide an impermeable shield over the United States....If we could build and deploy a genuine impenetrable shield over the United

States, we would be willing to spend not $40 billion, but any reasonable multiple of that amount that was necessary. The money itself is not the problem: the penetrability of the proposed shield is the problem.[27]

Strategic defense, however, need not be absolutely 100 percent effective against an all-out attack to be strategically and politically worthwhile. Strategic defense capable of limiting leakage to a few tens of warheads is technically feasible and affordable. While the casualties resulting from such an attack would be bad, this is far preferable to the more than 100 million who might die if the U.S. were undefended.

Flaw Two is the assumption that the Soviet Union would respond to U.S. strategic defense programs by deploying more offensive weapons (missiles and bombers). Kosta Tsipis, Director of MIT's Program in Science and Technology for International Security, and a persistent critic of new strategic weapons deployments, for example, has said that "the most likely outcome of a U.S. effort to build defense systems for our cities will be an increase in the number and sophistication of Soviet offensive weapons and an intensification of the arms race."[28] It is more likely, however, that the Soviet Union would try to match U.S. strategic defense programs with a comparable defense effort.[29] Although Soviet leaders have shown a remarkable willingness to sacrifice the economic well-being of their citizens for military power (spending 13 percent of Soviet GNP on defense versus 6.5 percent in the U.S.), even their defense budget is finite. Soviet planners probably would be forced to choose between building even more offensive weapons to try to overcome U.S. defenses and spending more rubles on strategic defense systems. Soviet military doctrine emphasizes the need to destroy U.S. nuclear forces and other important warfighting assets in a surprise first strike, but it stresses even more the need to protect the Soviet motherland with defensive measures. Soviet leaders, therefore, would be unlikely to concede superiority to the U.S. in the critical area of strategic defense.

Flaw Three exaggerates worst case scenarios for strategic defense by falsely assuming that the Soviets would preferentially "go after" the U.S. civilians with their missiles. As far as U.S. experts on Soviet nuclear forces can determine, however, the primary targets of Soviet nuclear forces are U.S. nuclear forces, conventional forces, and defense industries, for these represent

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27 Department of State Bulletin, October 9, 1967. Quoted in General Daniel O. Graham, High Frontier: A Strategy for National Survival (New York: Tom Dougherty Associates, Inc. 1983), p. 75.

28 Los Angeles Times, March 30, 1983. Quoted in "Onward and Upward with Space Defense," Bulletin of Atomic Scientists, June/July 1983, p. 6.

29 Strode, op. cit, pp. 125-129.

the greatest threat to the Soviet Union.[30] U.S. civilians face grave danger from the collateral effects of large-scale Soviet attacks on U.S. military/industrial targets near cities, but the Soviets would be unlikely to send huge waves of missiles against the U.S. population per se. In short, the Soviet threat against U.S. cities is not insurmountable with strategic defenses.

Flaw Four is the contention that assured survival depends solely on space weapons that are not leakproof. The key to strategic survival, however, would be to deploy multiple layers of missile defense systems: a space based layer to attack Soviet missiles in their vulnerable boost phase; a ground or space based layer to attack Soviet warhead platforms ("buses") in their mid-course phase; and a ground based layer to attack Soviet warheads as they fall through the atmosphere back to earth. Air defenses against Soviet bombers and cruise missiles and civil defense measures would back up ballistic missile defenses. As Soviet missiles and bombers passed through each defense layer, fewer and fewer weapons would survive--making the task of defense easier for each successive defense layer.

Flaw Five argues that the U.S. cannot afford an effective strategic defense. But even McNamara, an avid cost-cutter, recognized that removing the nuclear sword of Damocles hanging over the United States is worth a very high cost.[31]

STRATEGIC DEFENSE IS NOT DESTABILIZING

The most frequently used argument against strategic defense is that it is destabilizing--that it would increase the chances of nuclear war. Critics say that Soviet leaders would feel threatened by U.S. strategic defenses because they would cut off the Soviet Union's effective second strike response to a U.S. first strike, and that the Soviets then might be tempted to attack the U.S. before it fully deployed its strategic defenses. Critics also argue that, if the U.S. were to deploy strategic defenses, U.S. leaders would be more willing to use force to solve U.S. security problems in the belief that the U.S. could fight, win, and survive a nuclear war. Finally, critics argue that deployment of strategic defenses would intensify the arms race, fueling U.S.-Soviet tensions.

These arguments are fallacious. In the first place, U.S. deployment of comprehensive strategic defenses would tilt the

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30 Joseph D. Douglass, Jr. and Amoretta M. Hoeber, Soviet Strategy for Nuclear War (Stanford, California: Stanford University Press, 1979), pp. 75-88.

31 Even a $250 billion price tag--over twice the estimates of the Defense Technologies Study Team--would amount to only $10 billion a year for a 25-year program or less than 0.3 percent GNP.

strategic balance in favor of the U.S. only if the Soviet Union did nothing in response. Moscow could ensure strategic balance simply by matching U.S. efforts in the defense area. True, the USSR would lose whatever strategic superiority it now enjoys if the U.S. deployed nationwide defenses. But strategic inferiority to the USSR is an unacceptable and dangerous position for the West. Parity with the Soviet Union is the bare minimal condition for stable deterrence and U.S. security. For rational Soviet leaders, parity based on mutual U.S.-Soviet survivability should be preferable to nuclear war. Indeed, Soviet leaders might welcome U.S. deployment of strategic defense since it would reduce the likelihood, from their perspective, that the U.S. would launch a damage limiting preemptive attack.[32]

The charge that U.S. leaders would be more inclined to go to war if the U.S. had an assured survival capability is totally unfounded. The record of U.S. restraint in past East-West crises, even when the U.S. had overwhelming nuclear superiority, bears witness that U.S. leaders are cautious and responsible. In any case, if the Soviets were to match U.S. strategic defense efforts, there would be no advantage in a U.S. attack on the Soviet Union. A nuclear military victory would be impossible for the U.S. or the Soviet Union, and deterrence would be stable.

The charge that U.S. deployment of strategic defenses would fuel the arms race falsely assumes that the Soviets deploy nuclear weapons in direct response to U.S. force deployments. In fact, however, as former Defense Secretary Harold Brown has commented, "When we build, the Soviets build. When we don't build, the Soviets build." For the past twenty years, the Soviet Union has steadily deployed more threatening ICBMs to attack U.S. nuclear forces and more capable strategic defenses to protect itself from U.S. retaliation. Arms control and unilateral U.S. restraint in nuclear weapons deployments in the 1970s have had no discernible limiting effect on the intensity of the Soviet strategic buildup. Indeed, improvements in Soviet strategic capability have been most dramatic since the signing of SALT I in 1972. In addition to deploying a large force of multiple warhead ICBMs capable of destroying U.S. ICBMs in a first strike, the Soviet Union is in the process of acquiring an ABM breakout capability, which would tilt the strategic balance even more in its favor. U.S. deployment of strategic defenses would restore the strategic balance, which could only enhance deterrence of nuclear war.

CONCLUSION

Since the late 1960s, the U.S has lived with the threat of destruction of its society in a very short time by Soviet nuclear

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32 Colin S. Gray, "A New Debate on Ballistic Missile Defense," Survival, March/April 1981, p. 69.

missiles. To prevent this, the U.S. has developed offensive nuclear weapons designed to destroy the Soviet military capability to wage nuclear war successfully. Deterrence has rested ultimately on the fear of nuclear holocaust and the hope that Soviet fears equalled American fears. It is strategically imprudent and morally irresponsible, however, for the U.S. to base deterrence solely on this hope and the capability for retaliation. The U.S. needs strategic defenses to bolster deterrence and to protect the U.S. homeland should deterrence fail.

The deployment of an effective assured survival capability will take at least 15 years, in part because of the further development needed in space based ballistic missile defense weaponry. In the meantime, Congress and the Executive must work to improve the U.S. capability to use nuclear weapons in a limited manner by supporting programs for enhancing the survivability of U.S. command and control systems and offensive forces, especially the ICBM force. It is essential, however, that the U.S. move quickly to devise a comprehensive set of programs for strategic defense of the nation and that Congress begin funding these at required levels.

Many politicians may be tempted to postpone a decision on strategic defense programs because of their cost. On the issue of nuclear war survival, however, there is only one choice. It makes no sense to continue to live under threat of nuclear destruction if survival is possible.

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arguments presented by proponents, but provide representative reasons and logic for a defense system for the US. The following list briefly summarizes the rationale for a BMD that was identified in these articles:

a. Reduces fatalities in a nuclear war.
b. Incentive for the Soviets to engage in meaningful arms control negotiations.
c. Strengthens retaliatory-strike capability.
d. Good economic investment for national security.
e. Economically the best alternative for providing defense for the country.
f. Less conducive to an arms race.
g. May stimulate a race between the US and USSR for defense systems rather than more offensive weapons.
h. Provides hope to the American people for the future of mankind.
i. US is morally responsible for saving lives, not destroying them.
j. Creates Soviet uncertainty in the success of their first-strike capability.
k. Increases allies' confidence in US deterrent capability.
l. US hedge against Soviet political and technological changes or advancements.
m. Provides protection against attacks from third world countries.
n. Insurance against a massive nuclear war due to an accidental nuclear launch.

BMD history indicates that current and future proponents of a BMD will develop new rationale as technology and the world environment changes. In addition, some of the rationale originated in the past and identified in this anthology will be used again to defend opposing positions on BMD. The BMD question that faces the country today has no easy answers, but is a question that both proponents and critics will continue to analyze and document now and in the future.

Chapter Five

SUMMARY

Since President Reagan's "Star Wars" speech in 1983, the need for a BMD has become one of the most visible and hotly debated issues that the US faces today. However, it is not a new issue. Since 1969, opponents and proponents of a US BMD have documented and revised their positions as technology, domestic affairs, and international relations changed. Therefore, this anthology includes nine articles that are representative of the fundamental rationale and the specific rationale for a BMD from 1969-1984.

The fundamental rationale for a BMD that surfaces throughout the period is that a BMD is necessary for deterring a nuclear war. Proponents of a BMD primarily justify their position on the perception of the enemy threat and US capabilities. Proponents of a BMD contest that the nuclear threat confronting the US has progressively increased and the capability of the US to deter a nuclear war has declined. They conclude that a US BMD is necessary to insure a balance of power between the world nuclear powers. This balance of power leads to deterrence and ultimately national security. However, other rationale for a BMD was stated by authors to support this main theme and strengthen their case for a US BMD.

Authors that argued for a US BMD incorporated political, military, economic, and moral rationale in their writings. Although many of the arguments for a US BMD have not changed drastically over the last 15 years, specific rationale for a BMD has varied to reflect different periods in BMD history. For instance, in 1969 and the 1970s, authors stated that a BMD was primarily needed to protect the land-based deterrent force which is a part of the US retaliatory capability. But with the new emphasis on the Strategic Defense Initiative, the proponents for a BMD have focussed on developing a system to move away from a strategy of retaliation to a strategy of self-protection for deterrence.

The rationale for a BMD that is recorded in the nine selected articles in this anthology do not include all the

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the United States be the first to develop effective defensive capabilities, giving us a persuasive negotiating posture for arms reductions. Under those circumstances, we could propose to join the Soviets in methodically eliminating the intercontinental ballistic missile as the premier weapon of strategic war.

The pessimistic view sees the Soviets as the first to develop a real defensive capability. We should have no illusions that they would then offer us the same option of pursuing mutual equitable arms reduction. Rather, we should expect them to step up their program to expand their sphere of influence and control, and to blackmail the United States into inaction.

Unfortunately, this is a real possibility. Even if some Americans do not value U.S. military technology, the Soviet Union most assuredly does. In the past, their technology base was simply never good enough to allow them to approach our capabilities. But that gap is diminishing as a result both of our own lessened attention to long-term defense needs and the Soviet Union's relentless push over past decades to catch up. In advanced-technology defenses, in particular, the Soviets have dedicated thousands of their best scientists and engineers for the past eight or ten years to develop the very weapons that some in the U.S. media have labeled "fantasy." The Soviets have built entire complexes, small cities if you will, to support that "fantasy."

In looking to the future, the president is therefore focusing on the forest rather than the trees. His view stretches toward the next century, and he is concerned about the lack of options he sees for his successors. It was this long-term issue, not the delusion that we can pull some incredible technological rabbit out of the hat, that made him willing to rethink our national course.

It was his conclusion—and vision—that we should not continue to depend solely on steadily increasing nuclear firepower to ensure our safety. Rather—and this is the essence of what he said last year on March 23—we should look toward our strong suit, technology, to create better options for national defense. He offered our national technical community both a moral and scientific challenge, and he offered America a vision of hope.

"The Soviets will...shift their strategic resources to other weapons...submarines, cruise missiles, advanced-technology aircraft...far more stable deterrents than ICBMs."

shown little interest in START discussions.

The first step in rebalancing this situation, MX, has both the accuracy and payload to drive the Soviets to reconsider their silo-based ICBM force. With its introduction in 1987, MX will force this reconsideration in the near-term. Because of its size and liquid-propellant system, the SS-18 has no realistic basing mode other than silos. U.S. preparations for a follow-on small, accurate mobile ICBM thus creates a dilemma for the Soviets. Soviet planners will face the prospect that their most effective system will have become both vulnerable and unable effectively to strike the system threatening it—similar to the U.S. position today. As the Scowcroft Commission intended, this prospect sets in motion a trend toward non-silo-based, lighter missiles. This in turn has a dramatic effect upon the Soviet's previous trump card, the large, heavy-lift ICBM, and begins a positive shift in the balance of strategic power between the U.S. and USSR.

But it does not necessarily drive the Soviets as far as we would like. Nothing prevents the Soviets from simply ignoring their silo vulnerability and retaining the SS-18's utility for preemptive strike until well into the late '90s. Not having the domestic constraints that we do, the Soviets could also make mobile their newer medium solid (MX class) MIRVed systems (such as the new PL-4). And although it contributes considerably to an easing of tensions, a move away from the heavy-lift ICBMs would not appreciably reduce the effectiveness, or inevitability, of other ICBMs once launched against their targets.

On the other hand, the president's defense initiative envisions the ability to destroy the attacking ICBM while still in its boost phase. It is at this point that the ICBM is most vulnerable and most valuable in terms of warheads destroyed. Even the most ardent technical critics of the defense initiative say that one of the Soviets' initial reactions will be to consider reverting to small, de-MIRVed, fast-acceleration boosters in an attempt to outrace this first level of defense. Even in this worst case, therefore, the defense initiative and the strategic modernization programs catch Soviet planners in a vise. They force the Soviets to consider actions beyond just deployment of "more-of-the-same"—beyond even the next step in fifth-generation ICBMs. It requires that they consider ICBM development at least two to three generations beyond that which they presently have on the drawing board, and it forces that consideration right now. Even were they to succeed in this effort to some degree, the Soviets would throw their ICBM force completely off its present development track. The force would be completely changed—it would be smaller, lighter, and de-MIRVed.

So in a very real sense, the president's Strategic Defense Initiative completes a cycle that began two years ago with strategic modernization. I believe this sends a clear message to the Soviets that the era of undisputed superiority of the ICBM is coming to a close. But contrary to some people's fears, nothing is going to happen suddenly. The shift toward defense will not occur in a preemptive or destabilizing manner. We will have to coordinate this initiative carefully with our arms control and strategic modernization programs, and our allies. And we will have to continue to rely on our present strategic deterrent for some years to come. But each one of our defense technology demonstrations will add another word to the handwriting on the wall for ICBMs.

In response, the Soviets will, I believe, do what we have had to do—shift their strategic resources to other weapons systems. Some critics cite this as a failing; after all, we will not have provided the "magic bullet" to end all threats to all systems for all time. But I see it as a major plus. If we can reduce the effectiveness of the ICBM, we make it far easier to negotiate its reduction and eventual elimination as the cornerstone of their strategic arsenal. Let the Soviets move to alternative weapons—to submarines, cruise missiles, advanced-technology aircraft. Even the critics of the president's defense initiative agree that those weapons are far more stable deterrents than ICBMs.

In the end, it seems to me that we can approach the debate about strategic defense as either optimists or pessimists and still come to the same conclusion: we must proceed. The optimistic view would have

tromechanical methods, might permit operation of high-power space lasers on the ground. This option could allow both easier operation and the most security for complex and expensive components. We are also seeing important progress in using the structural shock effects of ultrashort laser *pulses* to create damage quickly by impulse rather than through the heating effects of slower-acting continuous beams. And there have been recent advances in more familiar traditional nonnuclear ballistic-missile defense technologies that may be extrapolated to the needs of a midcourse intercept and self-defense as well.

The Fletcher panel concluded that we can now project the overall technologies to develop defense capabilities that drastically reduce the threat of attack by ballistic missiles. Such capabilities would be effective not only against today's missiles, but also against those that could reasonably be expected to be developed to counter such a defense system. Any eventual system will likely consist of layers, using different concepts and technologies, designed to respond first to ballistic missiles in the highly vulnerable boost phase, then in the long midcourse phase, and finally during initial reentry into the very high atmosphere.

I believe it will take five or six years of R&D to bring us to the point where we can make the critical decisions about any actual development or deployment of real systems. There will be understandable temptations—and pressures—to move quickly to near-term deployment of whatever is the best technology we have available at the time. That would be a mistake. We must explore high-risk, high-payoff ideas, which have historically been the backbone of U.S. technological supremacy. And even more important, we must weave those ideas into a smooth transition of both policy and technology. If there is any one policy area in which I would invite bright young minds to work the hardest, it is in the area of this transition.

At the same time we have to guard against understandable tendencies of scientists and engineers to become so fascinated with the research process that they never get out of that stage. Secretary of Defense Weinberger has defined the proper balance—building the defense initiative around a progressive series of subsystem demonstrations of evolving capabilities. Each of these demonstrations would entail a militarily meaningful technology, a building-block piece that would not broach treaty limitations.

But just as such activities would not violate existing treaties, however, neither would they by themselves demonstrate complete and workable ABM systems. Actual systems involve complex interweaving of surveillance, acquisition, tracking, and kill-assessment; directed-energy and conventional weapons; battle-management systems and their interfacing hardware and software; support systems and subsystems, such as power; and C³I. But were I advising senior Soviet planners, I would observe that demonstrations of the components in these areas showed critical parts of an effective defense were well in hand.

At this point, I should re-emphasize that in every national defense strategy or action the president's overriding objective has been that of drastic reduction of offensive nuclear arms—especially ICBMs. In this case, the prospect of an effective future defense capability, coupled with the Strategic Modernization Program, begins for the first time to clamp down upon the heretofore unchallenged Soviet use of the ICBM as their preeminent weapon of strategic war. For example, Soviet efforts in the late 1970s resulted in an SS-18 deployment whose capacity to inflict damage on the United States is simply staggering. The SS-18 has gone unchallenged, secure in its modernized silo against which our own Minuteman presently has relatively little effectiveness. On the other hand, the SS-18's offensive punch has caused consternation in our own strategic planning circles.

The *existing* SS-18 fleet alone (only half their ICBM capability) can carry nine times the total payload of the *planned* MX. As a result, not only are all our strategic, industrial, and socioeconomic assets at naked risk, but 85%-90% of our present ICBMs are also vulnerable to first strike. We examined (unsuccessfully) more than 34 basing modes for our future ICBMs—all in an attempt to cope with the SS-18's ability to throw the kitchen sink at us. Conversely, the only U.S. weapon that could effectively attack the SS-18 in the event of war, the MX, is embroiled in a domestic political battle for its life.

That is the problem in a nutshell. Soviet ICBMs, as represented by the SS-18, are relatively secure from attack, threaten U.S. ICBMs (and all other targets), and are today unstoppable once launched. Small wonder the Soviets have

"It will take five or six years of R&D to bring us to the point where we can make the critical decisions about an actual development or deployment of real systems."

However well-intentioned the freeze and disarmament advocates, freezing the present situation into permanence cannot produce stability. Present START and build-down proposals *would* begin the long road to lessened tensions in the near-term. But the American people feel themselves trapped in a dilemma. On the one side, the advocates of maintaining the purity of offensive standoff ask that we believe this situation can go on for an indeterminate period of time. On the other side, the advocates of total disarmament would have us believe that not only could we negotiate such a total weapons ban, but that neither side would cheat—*at all.* Facing either extreme as one's only hope for the future was unacceptable to the president. He wanted his successors to have further options.

In his March 23 speech of last year, the president expressed a deep-felt sense of obligation. The universe may not owe us an existence. But as president, he feels he owes us a greater sense of future than that portrayed in "The Day After." The president feels strongly that restoring hope in that future is critically dependent upon developing the means by which mutual security in this nuclear age does not depend solely upon the threat of instant, and irrevocable, retaliation. In this light he issued a challenge to the technical and strategic policy communities to begin such an effort. In so doing the president knew full well that in even suggesting such an investigation he was departing from established dogma. Neither was he unaware that there were "formidable technical tasks...that may not be accomplished before the end of this century." But the President has taken the view that "current technology has attained a level of sophistication where it is reasonable to begin this effort." I agree.

It is important to stop here and reconsider exactly what the president proposed...and did not propose. The president did not propose a system. Neither did he propose an attempt to repackage traditional ballistic missile defense of silos, not create a star-wars fantasy. He did propose a very basic idea—one which he had thought about for some time, and whose consideration had been made possible by only recent advances in several technologies.

For more than five months, therefore, some 50 of our nation's best technical minds—in the panel chaired by former NASA Administrator James C. Fletcher—closeted themselves, called in hundreds more national technical experts, and devoted their efforts almost exclusively to the president's challenge. In the end, they concluded it was not an unrealistic goal and probably could be done. But at the same time they cautioned that it will require a national will and long-naul commitment that this country has sometimes found hard to maintain.

The basis for their optimism, however, is our tremendously broad technical progress over the past decade and in some specific areas, over the past year or so. Consider the progress we have been seeing in information processing, a technology absolutely critical for any fast-response system. Ten years ago it would have been pointless to talk about the kinds of data-transfer rates we routinely use today. Our high-speed processing capabilities then were relatively rudimentary. Ten years ago we were not even thinking of anything as ambitious as a 16K computer memory chip. For the past year the phone company has been installing 256K chips in the field; a major home computer company is about to release a unit with similar capacity priced under $500; and an adventurous research group is now talking about having 4-megabit memory chips available within a few years. Such advances in data processing change not only information-transfer technologies, but all other technologies as well—quickly.

In related areas we have achieved truly incredible advances in our ability to use satellites for navigation, for communications, and for reconnaissance. At the same time, our knowledge of how to both hide and protect these assets has increased remarkably. As might be expected, we regard survival of our space-based systems as key to any eventual success. To say that we would be satisfied with today's standards would subject us to justifiable criticism. To say that we have good reason to chart our progress in these areas and project satisfactory capabilities, however, is correct. In either case, this is one area in which I would invite bright young minds to provide fresh and new ideas.

In another, totally different technology, we have also seen recent advances that permit us to compensate for the atmospheric breakup of laser beams. That has been a major obstacle to the possible use of long-range laser defenses. New laser techniques, along with mirrors in space that could be formed as phased arrays and pointed using high-speed elec-

George A. Keyworth II, science advisor to the president and director of the Office of Science and Technology Policy since 1981, oversaw laser fusion work at the Los Alamos Scientific Lab when he headed the experimental physics division.

If we can reduce the effectiveness of the ICBM, we make it far easier to negotiate its reduction and eventual elimination

by George A. Keyworth II
Science Advisor to the President

recognized as precarious in the long run. At first we minimized our risks by deliberately pushing the ante very high: mutual assured destruction; and by keeping the equation of state down to that of a two-body problem: the U.S. vs. the USSR. As time went by and more players entered the game, we maintained the equation's simplicity by combining the emerging nuclear powers into two power blocks, NATO and the Warsaw Pact. As systems became more flexible, theoretical gambits other than mutually assured destruction became available to planners. But the end game is that in all of these scenarios there remained catastrophic destruction.

Through the '50s and '60s, strategic stability was presumed by the West and based on a great preponderance of power. But there has been increasing realization by the American people that our superiority has quietly vanished, replaced by a rough parity with the nuclear forces of the Soviet Union. However, not only has parity (some say Soviet superiority) not brought the promised stability, but new players, new weapons, and new options have entered the scene, and our adversaries have changed the "rules" by which we previously assured ourselves of security. In the end, though, we were willing to follow the precepts of our national leadership on the trust that true solutions would begin to evolve—if only given time.

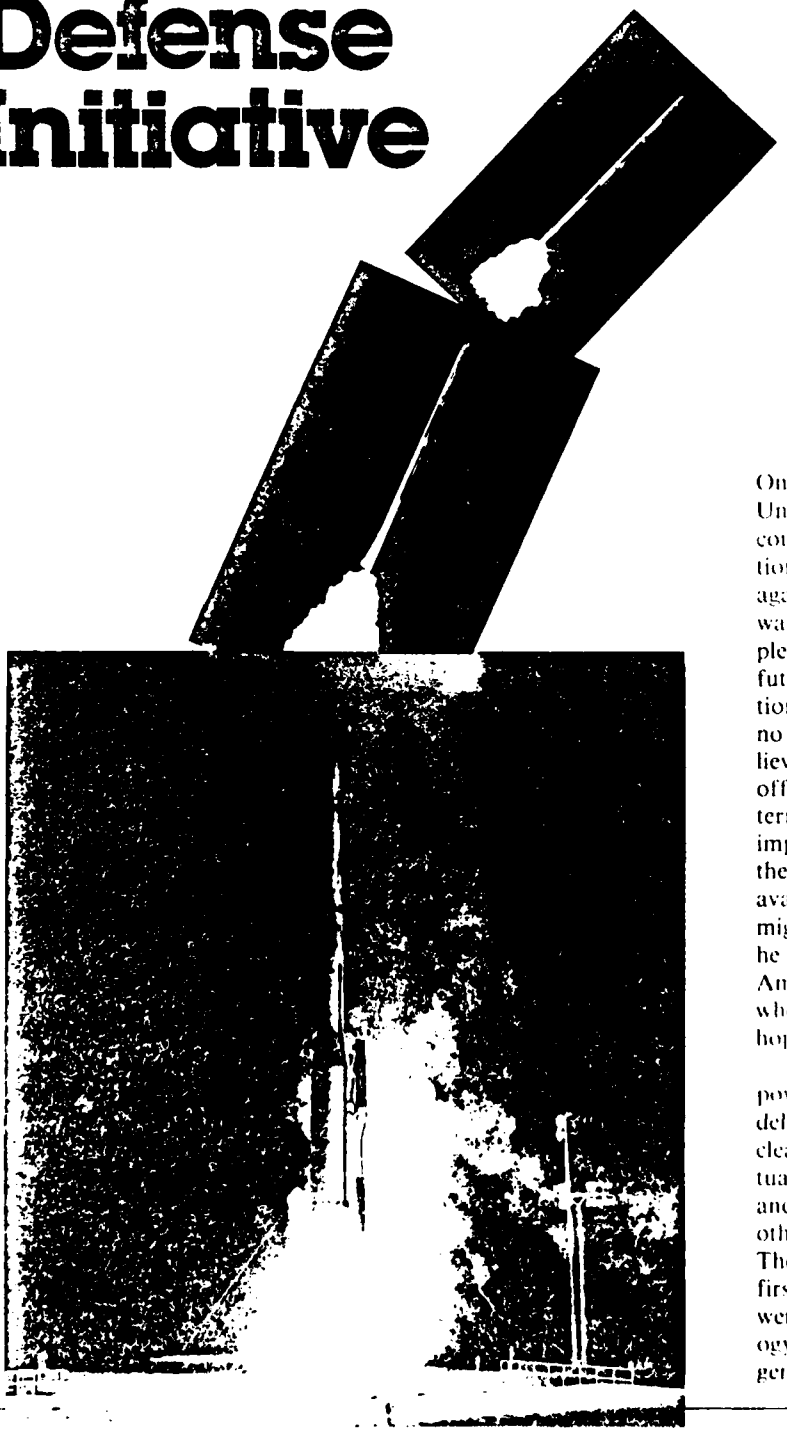
Although reliance on a traditional (but modernized) offensive deterrent will continue to serve (*must* serve) for the most immediate future, Americans have begun to realize very little has changed over the past 40 years, and they see little evidence of change in the future. There appears to be a national feeling that sooner or later time will run out. From this feeling the freeze movement takes its roots and the cause for even unilateral disarmament has increased in impetus.

Disarmers, however, offer no real long-term solution. Claims have been made that the thresholds for catastrophic "end-of-the-world" scenarios ("nuclear winter," for example) occur at very low detonation levels. Some say the critical level is as small as 100 megatons; others say a gigaton or more. The debate rages. Disciples of these scenarios argue this situation as cause for disarmament. I see that argument as moot. Taken alone, scrapping even an incredible number of weapons—say, nine out of ten—would not reduce the weapons inventory beneath the catastrophy-threshold conditions set by some of my colleagues. Some disarmament advocates go further to propose *total* nuclear drawdown. Not only do they then ignore realpolitik, but also the fact that our exclusive nuclear club is not so exclusive anymore.

Up to this point, the simplicity inherent in a two-body balance provided a great measure of international discipline and control. But neither we nor the Soviets can control the nonaligned nations, and some of those nations can only be described as remarkably ill-disciplined. High-ranking former officials have waved aside this problem by simply claiming that, if we really get serious, we can control proliferation. But if the technology transfer we presently see from our Western democracies is any indication of related proliferation tendencies, Third-World entry into the nuclear arena is not problematic, it is inevitable.

Even then, other oft-quoted experts argue that third-party defense pacts (wherein the U.S. or USSR pledges nuclear retaliation against any nonaligned nation attacking another nonaligned nation) would provide stability. In this instance I can confidently predict there quickly will be no more nonaligned nations. All will sidle up to one Big Brother or another, and none will be any more disciplined than before. The result of such an interlocking combination of treaties and "understandings" needs little imagination.

A sense of obligation—the Strategic Defense Initiative



Experimental nonnuclear interceptor rises to meet a missile in this artist's montage.

On March 23, 1983, the president of the United States set forth a challenge to the country: to begin a concerted investigation of whether it is possible to defend against the nuclear weapons of modern war. He did this because he believes a people who see themselves as having no future options, other than massive retaliation, soon perceive themselves as having no future at all. He did this because he believes that rigid adherence to continuing offensive buildup as our sole means of deterrence is, in fact, contributing to that impression. He did this because he knows the technology is available, or becoming available, with which effective defenses might be developed. He did this because he feels a sense of obligation to give the American people a set of future options where there are now none, and a sense of hope where there is little now perceived.

For almost 40 years, two superpowers that controlled the weapons and delivery systems with which to wage nuclear war have followed a policy of mutual suicidal standoff in one form or another—necessary because there was no other real choice during the early years. The men who were the architects of this first-generation deterrence, however, were able to combine policy and technology to produce a stable strategy for two generations. But this stability had to be

The move away from offensive nuclear weapons as much as possible will give the US people a hope of security in the future.

George A. Keyworth's article was copied from the April 1984 edition of Aerospace America and starts on the next page.

ARTICLE THREE - "A SENSE OF OBLIGATION - THE STRATEGIC DEFENSE INITIATIVE"

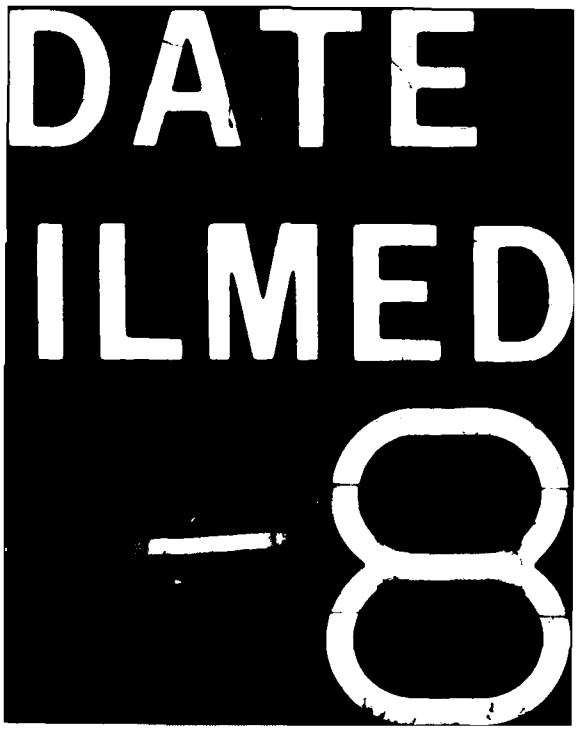
The article, "A Sense of Obligation - The Strategic Defense Initiative," was written by George A. Keyworth II in April 1984. He has been Scientific Advisor to the President and Director of the Office of Science and Technology Policy since 1981. At Los Alamos Scientific Labratory, he headed the Experimental Physics Division and oversaw laser fusion work (8:58).

Mr. Keyworth defends President Reagan's challenge to the country to investigate alternatives to the current policy of massive destruction for deterrence. As a result, his main theme revolves around the need to find an option to massive destruction for the security of the nation because the American people are losing hope for the future. Hope for the future has diminished because of changes in the world power structure of the 1950s and 1960s.

The author identifies two sources of threat that cause the condition of lost hope: the Soviet offensive threat and the growing nuclear threat in the third world that the US faces. These threats may make our current strategy of massive retaliation obsolete. Americans' realization of these facts has cast a cloud over the country so that Americans feel that the strategy of massive retaliation will soon serve no purpose. Motivated by this understanding, Keyworth states that President Reagan initiated his proposal for strategic defense even though there are significant technological challenges.

Critics throughout the past 15 years have argued against a BMD by stating that technology was not available to reach US goals for defense. That argument remains today, but Reagan, Keyworth, and prominent scientists believe the technology is available or can be obtained in the near future. The goal of a strategic defense is not unrealistic. However, as other authors state, Reagan's Strategic Modernization Program must continue so that an umbrella of protection can be maintained until a BMD can be completed.

Keyworth points out that our country will continue to rely on our strategic forces for security in the near future, but will reduce these forces and may eliminate them if a reliable strategic defense is built. If a strategic defense strategy is adopted, there will be a transition from offensive weapons to defensive weapons that will not destabilize world security. Keyworth believes the Soviets will shift their strategic resources to other weapons as the US makes this transition.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